EMERGENCY VEHICLE OPERATIONS

REVISED FEBRUARY 2000

MISSION STATEMENT

We recognize the need to train officers to reach the delicate balance between the reason and severity of an incident and the risk of injury or death to bystanders, officers, hostages, and suspects. We train officers to make decisions during the operation of emergency vehicles which are ethical, informed, legal, and require the highest consideration of human life.

Emergency Vehicle Operations Curriculum Committee

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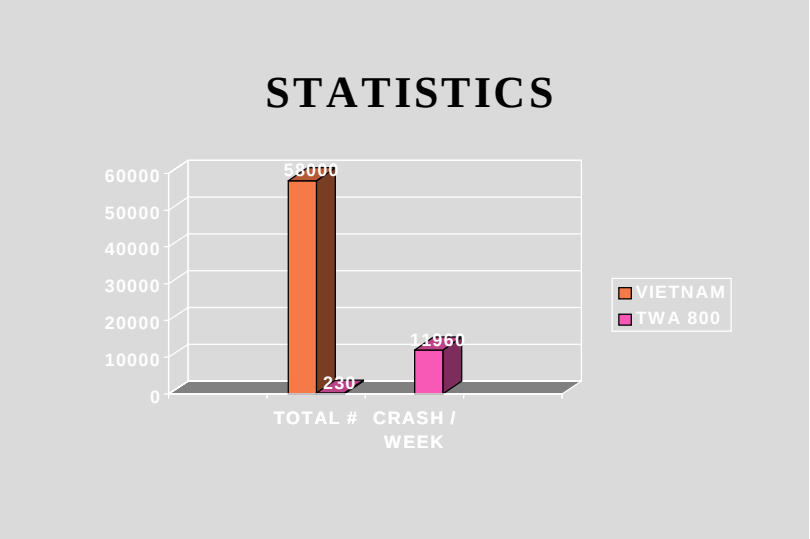
INTRODUCTION / STATISTICS

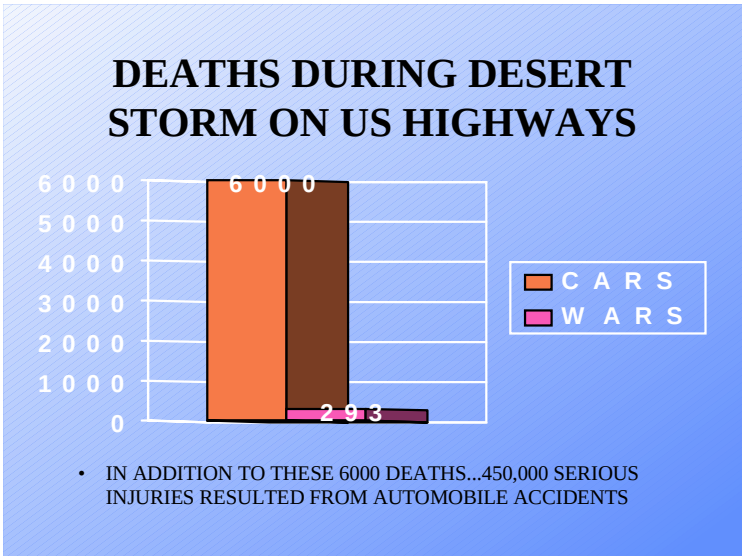
The number of fatalities from both the Vietnam conflict and the crash of TWA flight 800 have been numbers the public has been concerned about. We could crash one jumbo jet a week for a year, with less than 12,000 fatalities. Compare 12,000 losses to the amount of persons who will die in the same time on highways. Anytime persons are lost to some disaster there is discussion about minimizing the numbers of human who perish in these disasters. Why not driving "disasters?"

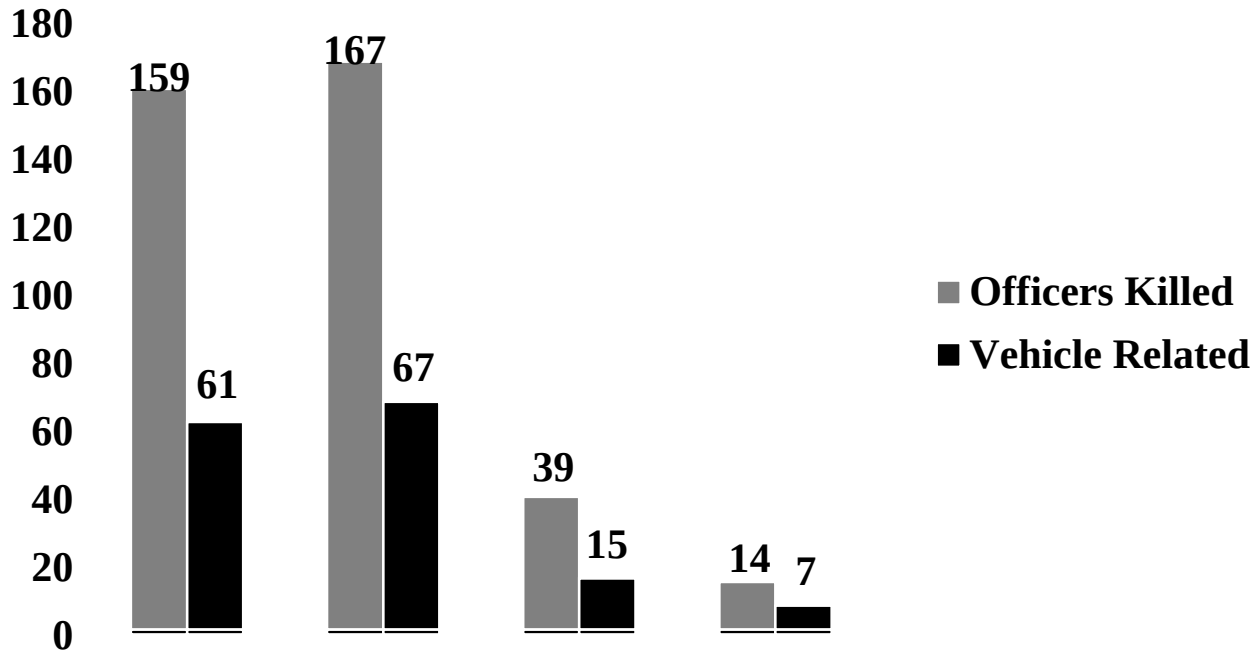


If we examine a more recent military action, Desert Storm, the numbers of individuals who perished in that action are readily available.

While 293 U.S. military personnel were killed in the Desert Storm conflict, there were 6000 Americans dying on the highways of our nation. Unless you were somehow immediately effected by one of these deaths, how many do you remember?

It has become acceptable to the public for Americans to die on the highways. There will be predictions and reminders prior to main holidays about the dangers of vehicle travel, but little is really ever done to address the problems. We see Hollywood sensationalize crashes and police pursuits but we never see the victims and the true impact.





LINE OF DUTY DEATHS

In order to fully grasp the scope of the problems and risks drivers of emergency vehicles face, we need to look no further than officers who have been killed in the line of duty in just the last couple of years. As the chart shows, a little over one third of all officers killed in the line of duty involve traffic. These deaths occur when officers crash, when others crash into officers, and when vehicles are used as weapons to take the life of an officer.

COLORADO STUDY

A study recently done in the state of Colorado looked closer at some of the risk and losses we face in law enforcement driving. The study found several interesting areas to consider:

During the course of the study, there were 314 Law enforcement officers killed in the line of duty. These line of duty deaths included everything from felonious assaults against the officers, to accidental deaths. Unless you continually study those statistics and conditions of officers dying in the line of duty, it may surprise you that 210 of those officers died in situations related to traffic.

THE RESULTS OF THIS STUDY AND THE EXAMINATION OF RECENT COURT DECISIONS FROM ACROSS THE UNITED

STATES INDICATE THAT EMERGENCY DRIVING IS YOUR SINGLE GREATEST LIABILITY IN LAW ENFORCEMENT!

This course is designed to challenge your decision making process, your driving skills, and force you to look at your overall attitude and approach to driving.

SIGNIFICANT CASE LAW AND STATUTES FOR EMERGENCY VEHICLE OPERATIONS

COUNTY OF SACRAMENTO V. LEWIS **118 S.Ct. 1708 (1998)**

FACTS:

Sheriff's deputies clearing unrelated call observe motorcycle approaching at high speed. Eighteen year-old operator (Willard) does not obey overhead lights, oral demand to stop or officer attempt to box a motorcycle in with patrol unit. Ensuing pursuit lasts seventy-five seconds over one and 3/10ths miles at speeds up to one hundred miles per hour with following distance as short as one-hundred feet. Two cars and a bicycle forced off the road. Chase ends when motorcycle tips over and officer's (Smith's) patrol car strikes sixteen year old passenger (Lewis) at forty miles per hour. Passenger pronounced dead at scene. Parents bring 1983 action alleging Fourteenth Amendment Substantive Due Process Right to Life Violation.

HOLDING:

United States Supreme Court rules ". . . that high-speed chases with no intent to harm suspects physically or to worsen their legal flight do not give rise to liability under the Fourteenth Amendment, redressible by an action under §1983."

REASONING:

In adopting the "Shocks-The-Conscience Test" the Court noted:

> Smith was faced with a course of lawless behavior for which the police were not to blame. They had done nothing to cause Willard's high-speed in the first place, nothing to excuse his flouting of the commonly understood law enforcement authority to control traffic, and nothing (beyond a refusal to call off the chase) to encourage him to race through traffic at breakneck speed forcing other drivers out of their travel lanes. Willard's outrageous behavior was practically instantaneous, and so was Smith's instinctive response. While prudence would have repressed the reaction, the officer's instinct was to do his job as a law enforcement officer, not to induce Willard's lawlessness, or to terrorize, cause harm, or kill. Prudence, that is, was subject to countervailing enforcement considerations, and while Smith exaggerated their demands, there is no reason to believe that they, were tainted by an improper or malicious motive on his part.

GRAHAM V. CONNOR **109 S. Ct. 1805 (1989)**

FACTS:

Diabetic (Graham) asks friend to drive him to convenience store at onset of insulin reaction. Graham hurries out due to long line at checkout and asks friend to drive him elsewhere. Officer (Connor) observes hasty entrance and exit from store and initiates investigatory stop one-half mile away. Although informed of diabetic reaction, officer forces Graham and driver to wait until confirmation from store that nothing happened. Graham exits car, runs around it twice, sits down on curb and passes out temporarily. The second officer states, "I've seen a lot of people with sugar diabetes that never acted like this. Ain't nothing wrong with the M.F. but drunk. Lock the SOB up." Graham shoved face down against hood and thrown headfirst into police car. Graham released after report from convenience store. Graham files 1983 action against officers claiming broken foot, cuts on wrist, bruised forehead, injured shoulder and ringing in ears.

HOLDING:

United States Supreme Court rules that in determining whether force was used to affect particular service is "reasonable" under Fourth Amendment, question is whether officer's actions are "objectively reasonable" in light or facts and circumstances confronting them, without regard to their underlying intent or motivation.

<u>BROWER V. COUNTY OF INYO</u> 109 S. Ct. 1378 (1989)

FACTS:

Brower was killed when the stolen car he was driving at high speeds for approximately twenty miles in an attempt to elude pursuing police crashed into a police roadblock. His heirs bring 1983 action alleging officers placed an 18-wheeler across both lanes of a two-lane highway, not illuminated, behind a curve, with other police cars positioned to "blind" Brower with their headlights.

HELD:

United States Supreme Court rules that alleged use of roadblock to stop driver of stolen car constituted "seizure" within meaning of Fourth Amendment.

REASONING:

"A roadblock is not just a significant show of authority to induce a voluntary stop, but is designed to produce a stop by physical impact if voluntary compliance does not occur."

<u>CITY OF CANTON V. HARRIS</u> 109 S. Ct. 1197 (1989)

FACTS:

Mrs. Harris arrested by Canton officers and transported to police station in a patrol wagon. On arrival, Mrs. Harris is found sitting on the floor of the wagon and responds incoherently when asked if needing medical attention. Officers leave her lying on floor after she slumps to the floor twice. An hour later, Mrs. Harris is released from custody and taken by family-provided ambulance to hospital. Mrs. Harris brings 1983 action under due process clause of Fourteenth Amendment.

HELD:

United States Supreme Court rules ". . . that the inadequacy of police training may serve as the basis for §1983 liability only when the failure to train amounts to deliberate indifference to the rights of persons with whom the police come into contact."

ARNZEN V. STATE OF IDAHO 123 Idaho 899 (1993)

FACTS:

Idaho State Police officer is terminated from employment for Fish & Game Violation without "Loudermill" notice and opportunity to respond. Officer's action included 1983 claim against Director of Department of Law Enforcement in his individual capacity.

HELD:

Idaho Supreme Court states: "In order to determine whether Richardson, in his individual capacity, was entitled to qualified immunity, we must ask:"

1. Was there a clearly established law;
2. Did Richardson's conduct violate a clearly established right of Arnzen's; and
3. Was Richardson's conduct reasonable?

In finding that Richardson was not entitled to qualified immunity in his individual capacity, the Court specifically found, "Richardson's action was not that of a reasonably competent public official in Idaho in 1989".

IDAHO CODE, TITLE 49. MOTOR VEHICLES, CHAPTER 6. RULES OF THE ROAD

§ 49-623. Authorized emergency or police vehicles

(1) The driver of an authorized emergency or police vehicle, when responding to an emergency call, or when in the pursuit of an actual or suspected violator of the law, or when responding to but not upon returning from a fire alarm, may exercise the privileges set forth in this section, but subject to the conditions stated.

(2) The driver of an authorized emergency or police vehicle may:

(a) Park or stand, irrespective of the parking or standing provisions of this title;

(b) Proceed past a red or stop signal or stop sign, but only after slowing down as may be necessary for safe operation;

(c) Exceed the maximum speed limits so long as he does not endanger life or property;

(d) Disregard regulations governing direction of movement or turning in specified directions.

(3) The exemptions granted to an authorized emergency or police vehicle shall apply when necessary to warn and to make use of an audible signal having a decibel rating of at least one hundred (100) at a distance of ten (10) feet and/or is displaying a flashing light visible in a 360 degree arc at a distance of one thousand (1,000) feet under normal atmospheric conditions.

(4) The foregoing provisions shall not relieve the driver of an authorized emergency or police vehicle from the duty to drive with due regard for the safety of all persons, nor shall these provisions protect the driver from the consequences of his reckless disregard for the safety of others.

§ 49-625. Operation of vehicles on approach of authorized emergency or police vehicles.

(1) Upon the immediate approach of an authorized emergency or police vehicle making use of an audible or visible signal, meeting the requirements of section 49-623, Idaho Code, the

driver of every other vehicle shall yield the right-of-way and immediately drive to a position parallel to, and as close as possible to, the nearest edge or curb of the highway lawful for parking and clear of any intersection, and stop and remain in that position until the authorized emergency or police vehicle has passed, except when otherwise directed by a peace officer.

(2) This section shall not operate to relieve the driver of an authorized emergency or police vehicle from the duty to drive with due regard for the safety of all persons using the highway.

STATE OF IDAHO V. BARSNESS **102 Idaho 210 (1981)**

FACTS:

Barsness charged and convicted of violation of I.C. § 49-645 for failure to yield to an authorized emergency vehicle. Boise Police Department officer running lights, but no siren on felony in-progress call, strikes Barsness' vehicle turning left in front of emergency vehicle.

HELD:

Idaho Supreme Court holds that whether the driver of the emergency vehicle was driving with due regard for the safety of other persons, I.C. §49-606, was a question for resolution by the tryer of the fact and will not be disturbed upon appeal.

ETHICAL CONSIDERATIONS

More injuries and deaths usually occur each year from law enforcement related traffic accidents, than from police shootouts. Thus, it should be immediately clear how much of an ethical responsibility you have to not make driving mistakes, especially during emergencies. This is easier said than done.

Operating an emergency vehicle during a true emergency demands a total command of all the skills that will be presented during this course. You cannot afford to view this course as simply as it is fun to do. This is a serious business.

How well you do will largely depend on how hard you concentrate.

DRIVING PHILOSOPHY / DRIVING COURSE

The system of driving we instruct is based upon the actions of drivers. It is our belief that people get into trouble driving because they are not participating in the driving experience and are simply getting from one place to another with little regard for the process used. In order to address the driving skills necessary to survive in law enforcement driving, we have based our course on the two proximate causes of vehicle accidents:

1. **MISUSE OR OVERUSE OF STEERING.**

2. **MISUSE OR OVERUSE OF BRAKES.**

When people are not participating in real-time driving and are startled or surprised, the input to the vehicle controls are reflective of that surprise.

WE TEACH:
100% CONTROL OF THE VEHICLE
100% OF THE TIME

The philosophies we use to instruct driving skills and exercises are based upon the principles of low speed and high stress. We believe it is important to learn skills in a controlled environment where speeds are not critical to success and do not add an element of danger which may preclude the student from experiencing the learning goals. We recognize there will be difficulties learning and that sometimes you may begin to experience frustration. It is important to move beyond this. When frustration occurs your ability to retain and learn ceases.

It is not easy to change several years of driving habits and style. In order to become proficient in the skills and methods you will have to spend many hours beyond this course practicing the skills and internalizing them. We can provide you the basics and the methods but it is ultimately up to you to gain proficiency. It really is all about your attitude!

PROGRAM GOALS

1

REDUCE THE NUMBER OF CRASHES POLICE OFFICERS ARE INVOLVED IN.

2

REDUCE THE SEVERITY OF THOSE CRASHES THAT DO OCCUR.

3

INCREASE YOUR EFFICIENCY AS A DRIVER, THEREBY INCREASING YOUR EFFECTIVENESS AS AN OFFICER.

THE SINGLE-MOST IMPORTANT FACTOR WITH REGARD TO SKILL…

IT IS NOT HOW FAST YOU DRIVE; IT IS HOW EFFICIENT AND CONSISTENT YOU DRIVE.

4

IMPRESS UPON THE OFFICER THE RESPONSIBILITY, LIABILITY, AND PERSONAL RISKS OF EMERGENCY VEHICLE OPERATION.

THE FOUNDATION FOR MAKING GOOD DECISIONS INCLUDES ETHICS, ATTITUDE AND PROFESSIONALISM

YOUR VEHICLE AS A PLATFORM

One of the most important concepts to driving is beginning to think of your vehicle as a platform. If a driver can begin to picture the overall vehicle as a stable object, the process of driving becomes easier. This is a sometimes difficult process to develop but once the operator masters the concept, driving problems decrease and overall vehicle control increases dramatically.

The first component of understanding is to look at the effects of weight transfer on a vehicle. Every time a vehicle accelerates, decelerates or changes direction the weight distribution of the vehicle shifts. **This distribution of weight across the platform is called weight transfer.**

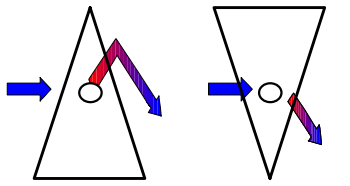
When you are driving, your challenge and responsibility is to keep the driving platform level, or stable, throughout all aspects of operation. This means whether you are accelerating, slowing or stopping, or changing the direction of the vehicle, you need to be constantly aware of the effects of weight transfer and potential benefits and risks such transfers present.

The second component of understanding is to look at the effects of weight transfer on stability of the vehicle. If you simply view the vehicle as an object, this is much easier.

In the following diagram, compare each object:

A stable object must rise at the center of gravity before it falls.

An unstable object will fall when force is exerted.

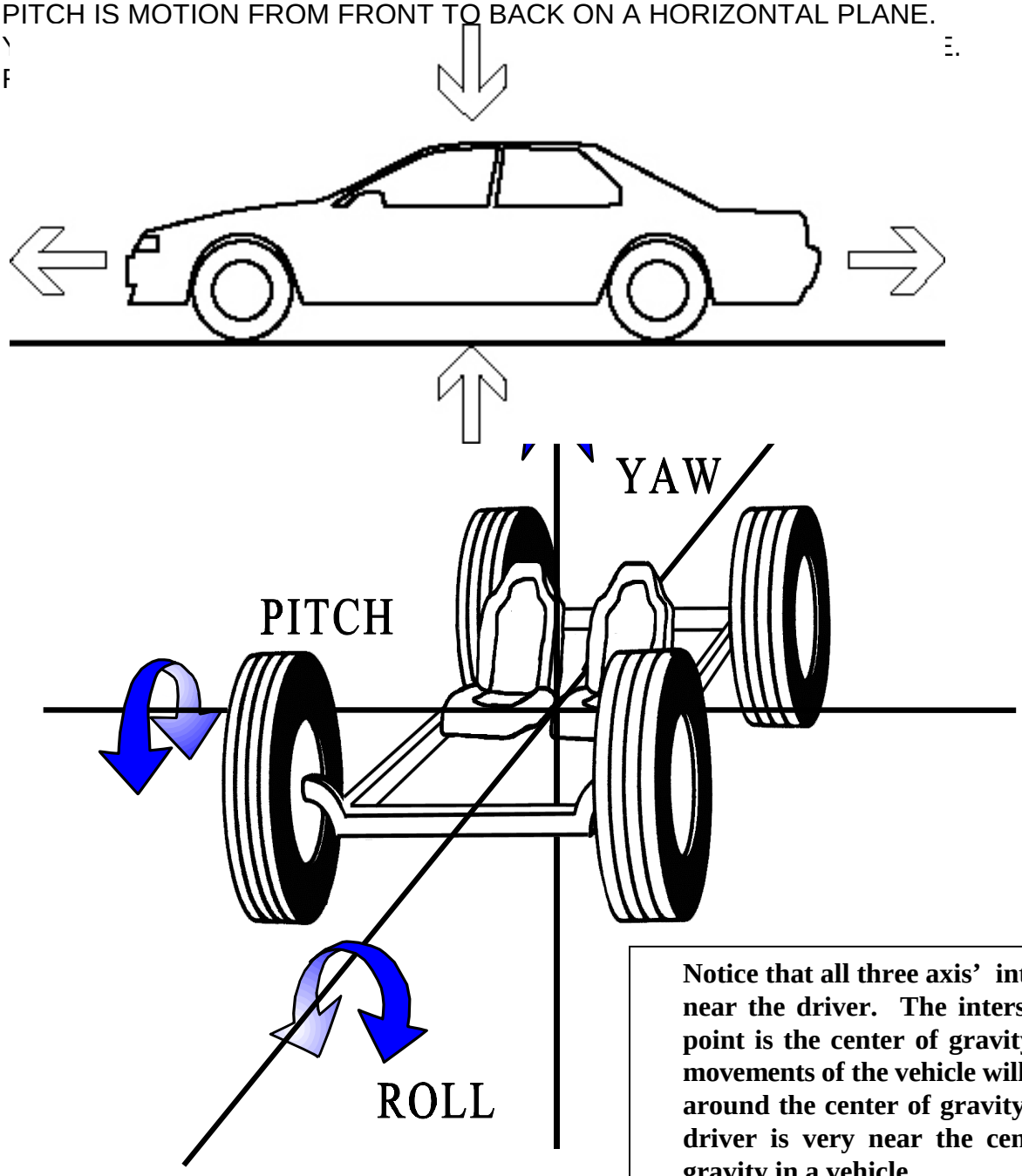


STABLE UNSTABLE

AXIS OF MOTION

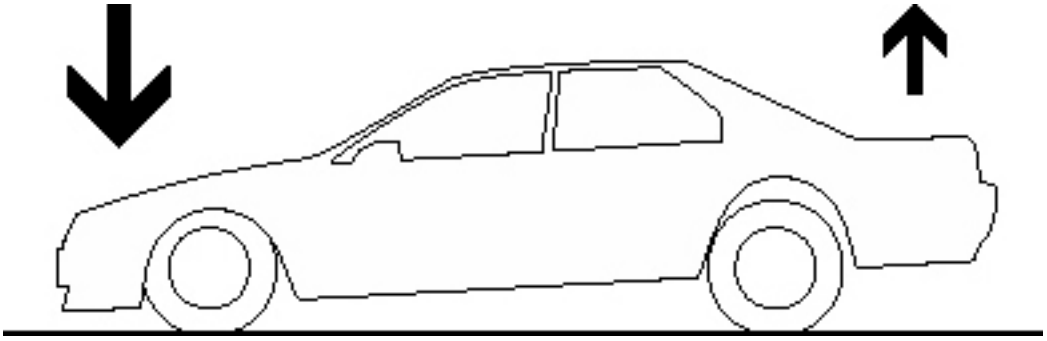
AXIS OF MOTION AND THE EFFECTS OF WEIGHT DISTRIBUTION

PITCH IS MOTION FROM FRONT TO BACK ON A HORIZONTAL PLANE.

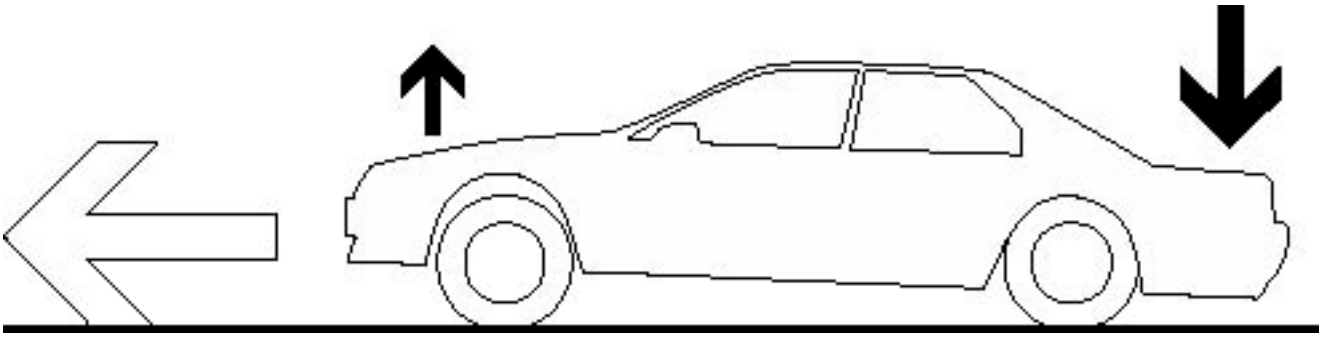


Notice that all three axis' intersect near the driver. The intersection point is the center of gravity. All movements of the vehicle will occur around the center of gravity. The driver is very near the center of gravity in a vehicle.

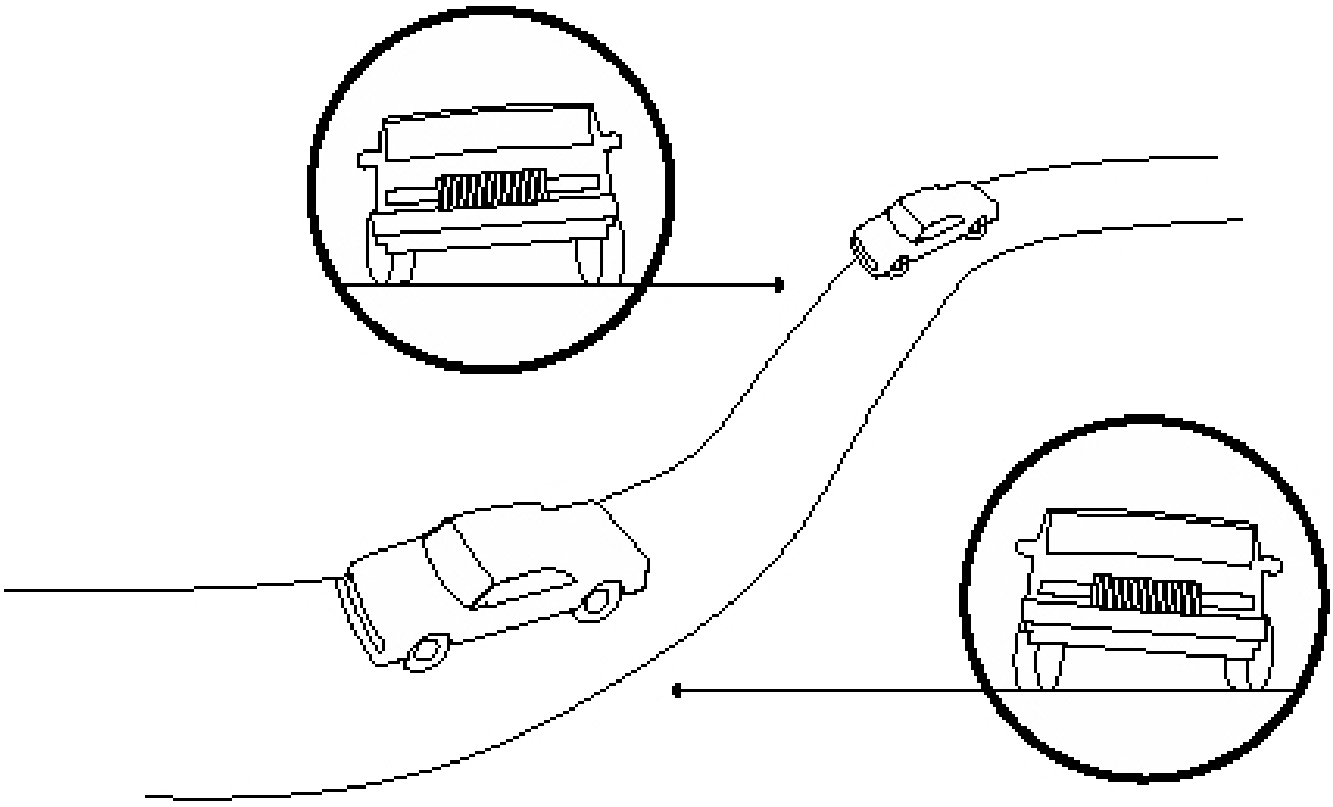
When the car is at rest, the car's weight is evenly distributed and it is most stable. This is also true of a car moving at a constant speed in a straight line.



Letting off the gas or applying the brakes moves weight to the front of the vehicle.



Releasing the brakes or applying the gas moves weight to the rear of the vehicle.



CHANGING DIRECTIONS SHIFTS WEIGHT FROM SIDE TO SIDE.

The third concept of understanding your vehicle as a flat and stable platform is a basic understanding of what effects the vehicle suspension and design has on vehicle control. To better grasp the effects of your suspension, consider some simple physical characteristics:

Energy is stored in the suspension system during a turn, through a curve, under braking, and under acceleration.

Stored energy must be dissipated.

Energy stored in a spring is an example of potential energy.

The key to controlling the release of spring energy is smooth steering.

As you begin to master the concepts of weight transfer and vehicle platform stability, you will begin to make your weight shifts and transfers smooth, not rough or jerky. This becomes particularly more important as you begin to operate smaller vehicles which have less overall weight or vehicles with higher centers of gravity such as sport utility vehicles.

Your Suspension System

- Works to balance the forces during a change in direction or velocity.
- Helps to smooth out weight transfer.
- Helps keep all four wheels firmly on the ground.
- Helps you keep the vehicle flat and level.

Good drivers work with the suspension system!

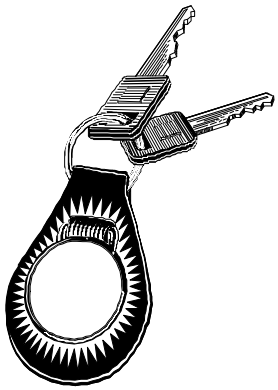
Remember this: Platform stability can only be accomplished by:

1. **Smooth, steady, acceleration and deceleration.**
2. **Slowing down and making smooth steering inputs.**

VEHICLE INSPECTIONS

Many accidents could be prevented by a simple five minute physical and visual inspection of your vehicle.

Inspect the vehicle every day prior to going on shift.



Ensure that any requested or necessary maintenance is performed prior to operation.

Check the vehicle after maintenance to assure requested repairs were accomplished.

When you conduct a physical and visual inspection you should try and utilize a simple check list. You should also conduct the inspection when the vehicle is cold.

A SIMPLE FIVE STEP VEHICLE INSPECTION

1. APPROACH VEHICLE AND CONDUCT A VISUAL INSPECTION

Vehicle attitude -

Is the vehicle sitting level at rest or are there visual indicators such as one corner being lower than the others, that something may be wrong.

Sagging springs or Shocks –

Suspension system is very important for safe and effective patrol car operation

Body damage --

Are there any new dents, dings, etc.

Leaks, puddles, etc.

2. VEHICLE WALK-AROUND AND EXTERIOR EQUIPMENT INSPECTION

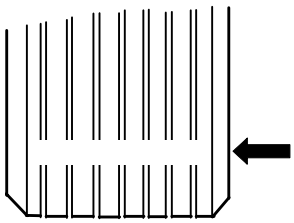
Head, tail, brake, back-up, and emergency lights

Cracked or bent rims, loose lug nuts

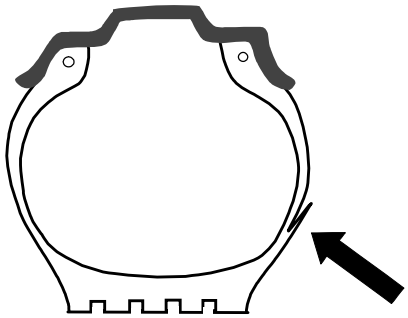
Windshield wipers

READING TIRES AND TIRE PROBLEMS

Tread Depth / Wear Bars



Tires should be immediately changed and discarded if the inspection detects poor tread depth (less than 2/32 of an inch), cuts in the sidewall or stone bruising on the sidewall.

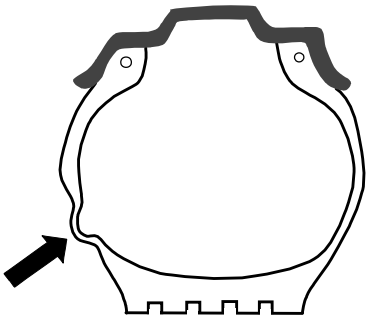


Sidewall Cracks or Cuts

Any crack or cut in the sidewall of a tire which exposes the steel belting will sacrifice the integrity of the tire and should be immediately changed.

Stone Bruises

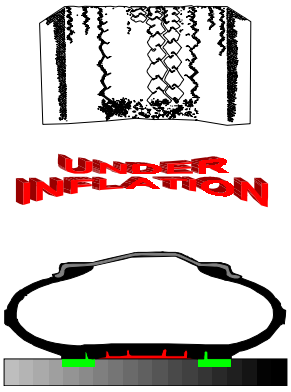
A stone bruise occurs when the sidewall of a tire contacts an object such as a curb. Air escapes past the steel belting and is trapped in the area between the belts and the rubber exterior of the tire. A stone bruise may be as small as an eraser head and as large as a golf ball. A stone bruise sacrifices the integrity of the tire and should be immediately changed.



Over-inflation:

Tires in this condition are very prone to hydroplaning. The excessive amount of air forces the tire to ride on only the very center portion of the tread pattern. This creates excessive wear in the center of the tire. Visual observation of this wear pattern is quite simple and easily remedied by checking air pressures.

Under Inflation:

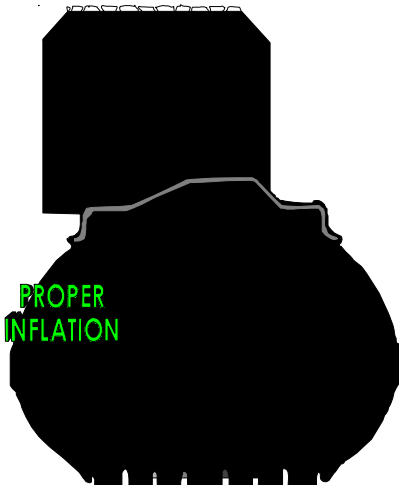


Tires do not last as long and will not perform at extremes. This is the most common tire problem. Tires which do not have enough air cannot effectively dissipate heat, as there is less contact with the driving surface and therefore less area to distribute heat. Because tires are manufactured in a process which uses heat to bond the rubber to the steel, too much heat will also cause them to disintegrate.

Other Tire Conditions:

Cornering or Camber wear may indicate tires which have been used excessively and will not handle under extreme cornering any longer. This condition is often caused due to drivers who carry too much speed in corners or vehicle alignment problems. The wear is obvious in the lack of tread pattern on the exterior of the tires.

Random Wear patterns may indicate tires which need balancing.



Proper Tire Inflation

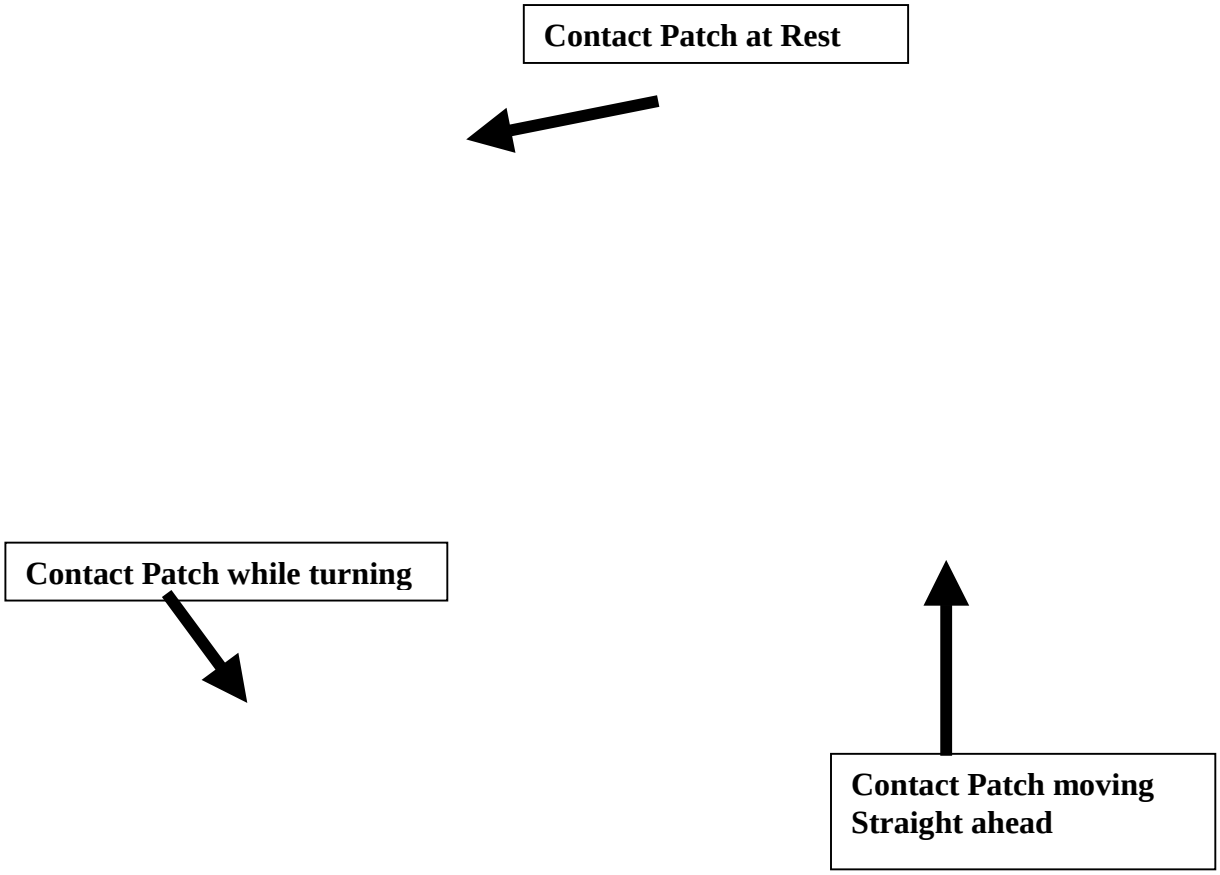
When tires are properly inflated, they will be <u>one (1) pound (+/-)</u> of the manufacturer recommended PSI which is imprinted on the sidewall of the tire. This tire has maximum contact with the driving surface.

<u>THE IMPORTANCE OF MAINTAINING CONTACT PATCHES WITH YOUR TIRES CANNOT BE UNDERSTATED. CONSIDER THE FOLLOWING:</u>

At rest, you have four contact patches about the size of the palm of your hand.

Because of certain dynamics of a tire in motion, this contact patch gets smaller, as your speed increases.

Can become as small thumbprints.



3. UNDER THE HOOD

Fluid levels

- Check when cold if possible for true reading.
- Fluids are color coded.
  - Yellow / Green indicates coolant fluid from radiator
  - Brown indicates oil
  - Red indicates brake or transmission fluid
  - Most windshield washer fluid is blue

Belts and Hoses

- Make sure wear is even and there are no frayed ends or sides on belts.
- Make sure there are no leaks in hoses

Loose wires or parts

Seepage

4. THE PASSENGER AREA

Check all equipment including control switches, gauges, indicator lights, mirrors, safety equipment, etc.

Cleanliness
(Loose objects become missiles in a crash)

5. VEHICLE IN MOTION CHECK

Steering

- The steering should be turned from steering lock to steering lock.
- There should be no jumps or areas in the steering when it is turned.
- You should not hear strange noise from the steering pump when at maximum lock.

Brakes

- Apply the brakes as you slowly drive away
- Brakes should be equal on either side and not pull to one side or the other.
- There should be no squealing (metal to metal) when they are applied.
- You should have resistance in the pedal and not be able to push the brakes to the floor.

Suspension

- Vehicle should not bounce up and down

Acceleration

- Check for smooth and even acceleration.
- Be aware of any throttle lag (time between application of accelerator and actual acceleration of vehicle)
- Should not cut out

MAINTENANCE ISSUES WITH EMERGENCY VEHICLES

Operator safety is dependant on the vehicle.

It is your life you are trusting to a poorly maintained vehicle.

Well maintained vehicles have fewer problems and are easier to control.

Most law enforcement agencies require their patrol officers to inspect their patrol vehicle and equipment before they begin their tour of duty. It is interesting to watch the difference in how careful some officers are while doing this and how careless others are when doing the same task. The difference is a matter of attitude. Some officers are more professional than others. The question is...What kind of officer will you be?

Some officers may even make fun of you for taking the time to carefully inspect your shotgun or other equipment. You will have to face peer

pressure throughout your career. It can be an extremely powerful force. Few occupations or professions can escape it. The difference with law enforcement is that giving in to peer pressure can mean doing something that you may regret forever...a life or a death may be permanently effected. It can also mean destroying everything that is important to you: your job, your career, retirement, reputation, spouse and most important, your self respect.

The bottom line is this:

You have an ethical responsibility to take care of yourself and your equipment. How well you choose to care for your equipment may determine if you, a citizen or another officer may live or die someday.

SAFE DRIVING

SEAT BELTS

According to the National Highway Traffic Safety Administration, 1997 crash statistics indicate some alarming trends. 41,907 lives were lost in 1997, about a 1% increase from the previous year. It is suspected that the abolition of the maximum speed laws had some impact on this figure, but no proof is offered in the statistics. Approximately $17 Billion was spent in medical care, $55 Billion in costs to employers, $54.7 Billion is lost production and the insurance and legal costs are staggering. Maybe the number that hits closest is this: Every person in the United States bears the economic costs of a crash, to the average of $580/yr in increased costs across the board.

By simply putting yourself into good position when you are seated in the vehicle, you begin to gain control. Between 9,000 and 12,000 lives could be saved each year by the use of seatbelts. In addition to the life saving benefits of seatbelts, their use sets a positive example with the driving public. When seatbelts are worn properly, they secure the driver firmly into the seat and aid in overall vehicle control.

MIRRORS

Drivers should develop the habit of utilizing their mirrors. Mirrors on the vehicle should be set so that the operator can gain maximum visibility around the vehicle with a minimum of head movement. When a driver sees something in the mirror which may cause a driving response, the area should be visually cleared by turning the head and looking.

FOUR COMPONENTS TO DRIVING

1. **STEERING**
2. **BRAKING**
3. **CORNERING POSITION / THEORY**
4. **ACCELERATION**

STEERING:

Seating Position

Good driver seating position is critical to the success of the vehicle operator. The driver must be comfortably positioned in the vehicle and able to reach the brake and accelerator pedal without full extension of the leg. Full extension of the leg will cause the driver to use larger muscle groups, which in turn causes the driver to have difficulty making small adjustments to the vehicle pedals.

Seating position also is important in establishing good hand and arm placement. If the driver is cramped, smooth inputs to the steering are much more difficult. Likewise, arms which are fully extended make smooth input nearly impossible.

The driver should be able to place the wrist of either hand on the top of the steering wheel and have the steering wheel touching right in the joint between the palm of the hand and the wrist. The driver should have a slight bend at the elbows when this is achieved.

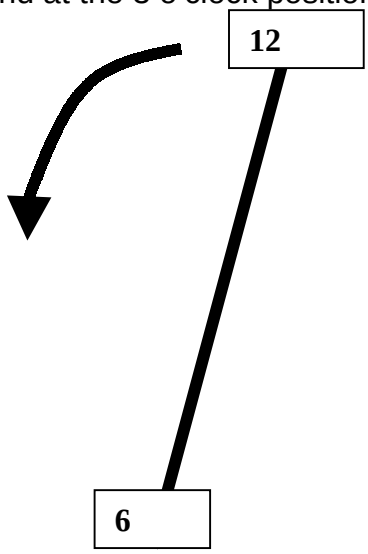
Shuffle Steering

Shuffle steering is the technique used when the driver is able to anticipate a turn or curve.

Using a light grip between your thumbs and fingertips, place your hands at the three and nine o'clock positions of the steering wheel. When the vehicle is traveling straight, this is the preferred positioning of the hands.

Mentally divide the steering wheel from the top (12 o'clock) position to the bottom (6 o'clock) position. Discipline yourself to keep your right hand on the right side of the steering wheel and your left hand on the left side of the steering wheel.

When you see a turn and anticipate the need to make steering inputs, move the hand on the side of the steering wheel which is the same as the direction you anticipate moving to the 12 o'clock position. In other words, to make a left turn, move the left hand to the top of the steering wheel, while maintaining the right hand at the 3 o'clock position.



As you begin to feed steering in, smoothly pull the steering wheel down towards the 6 o'clock position. The support hand mirrors the hand making the steering input until the hands physically touch at the 6 o'clock position. At this point, the support hand becomes the lead hand and smoothly continues making the steering inputs, taking the steering wheel back towards the 12 o'clock position.

When you begin to exit a turn or corner, simply reverse the process until the lead hand is back at the 12 o'clock position and the tires are pointed straight again.

Evasive Steering

Steering inputs made from the 3 o'clock and 9 o'clock position when the driver is surprised by the environment and does not have time to shuffle steer.

Despite the inputs from the 3 o'clock and 9 o'clock positions, the inputs should be as smooth as possible, as the vehicle platform will reflect the intensity of the inputs.

BRAKES AND PROPER BRAKING TECHNIQUES

Brake Lining Materials

The materials in brakes are typically manufactured to withstand about 650 degrees (f) of heat. While this may seem to be quite sufficient, there have been many times that temperatures in excess of 1400 degrees have been recorded on patrol vehicles during testing. That is obviously more than twice what the system was engineered to withstand and as such, when temperatures that excessive begin to build, a degradation of the entire braking system begins to occur.

Drum Brakes

Drum brakes are an internal expanding system. As the brake components begin to heat up, the drum actually expands, causing the brake shoes to travel a greater distance to achieve similar results.

Drum brakes typically cool in about 20-30% of the drum while approximately 70-80% of the drum is involved in the heat exchange process.

Drum brakes must be adjusted periodically. In order to adjust the brakes, the driver must back up and engage the brakes a few times.

Disc Brakes

Disc brake systems are called an external expanding system. As the components heat up due to braking, the disc actually closes the distance the pads must travel to contact it.

Disc brakes are typically more efficient in managing heat. Only about 20% of the actual disc is involved in braking, while approximately 80% of the disc is cooling.

Disc brakes are not without problems, as too much heat can lead to a warping of the brake disc (rotor).

Anti-Lock Brakes

Anti-lock systems are designed as an emergency aid for the driver. They allow the tires to continue to turn rather than lock and slide, giving the driver the ability to maintain directional control. Anti-lock systems are extremely useful when used correctly, but become dangerous when improperly utilized. They are designed to help drivers avoid potentially dangerous driving encounters, not to help drivers go around corners faster.

Friction

The contact between the surfaces of the braking components generates heat due to friction. Friction must occur for the braking to occur. Braking occurs when the heat energy created by the friction is dissipated throughout the brake disc or brake drum. When the components no longer exchange heat effectively, brake fade occurs.

Braking Techniques (General)

At all times you should treat your brakes gently.

Never stab or jam on your brakes. All braking should be done smoothly and efficiently.

The type of braking action that applies to most driving situations is:

Moderate steady braking.

Emergency Stopping

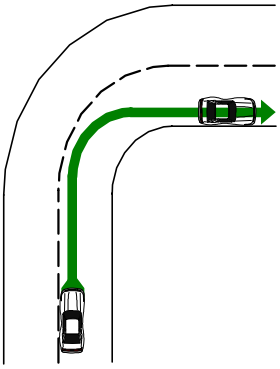
The safest and most efficient method to conduct an emergency stop is to Threshold brake . This type of braking is defined as maximum pressure applied to the brake pedal, just short of locking up the tires. When a vehicle is equipped with an anti-lock system (ABS), the threshold occurs at the point of ABS engagement.
Remember, as the heat in the braking system builds up, the braking effectiveness will go down. Try to keep the heel of your braking foot firmly planted on the floorboard of the vehicle.

Rolling Friction

The tires of a vehicle must be rotating in order to change direction.

There are multiple ways to avoid an obstacle in your path, but the tendency of most people is to immediately go to brakes, so the most common and effective method is to brake and steer around the hazard. If brakes are not an option, the driver should steer around the obstacle and use the vehicle accelerator to balance the weight of the vehicle as the rear of the vehicle begins to get lighter.

CORNERING PHILOSOPHY

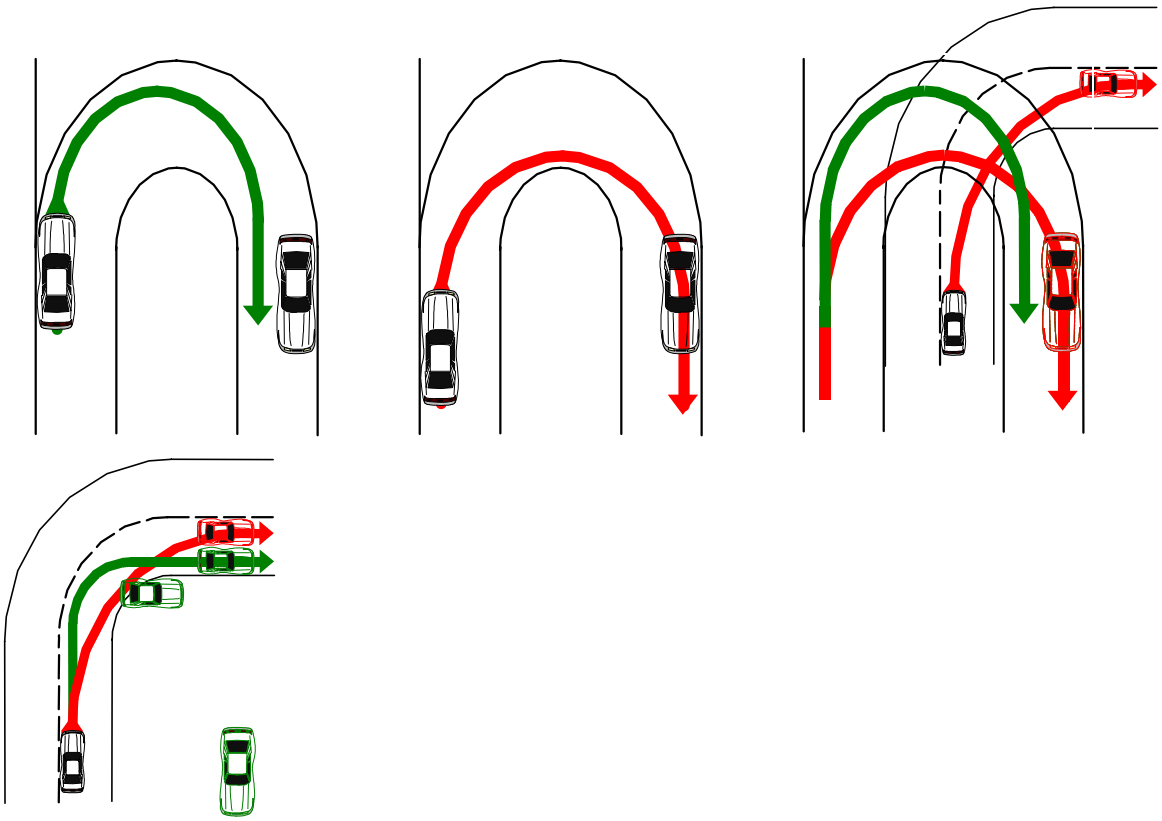


The cornering philosophy we subscribe to is based on the safest way to negotiate corners, not the fastest. We suggest using an outside entry to corners and moving through the corner to an inside exit.

The fastest route a driver can take through a corner is often called a racing line. This is a path through a turn based on an outside entry and an outside exit. While this is generally accepted as the fastest route, it is often filled with dangers that are not conducive to safe operation of emergency vehicles. The vehicle is perilously close to oncoming traffic at the corner exit and has limited ability to maneuver in the center portion of a turn.

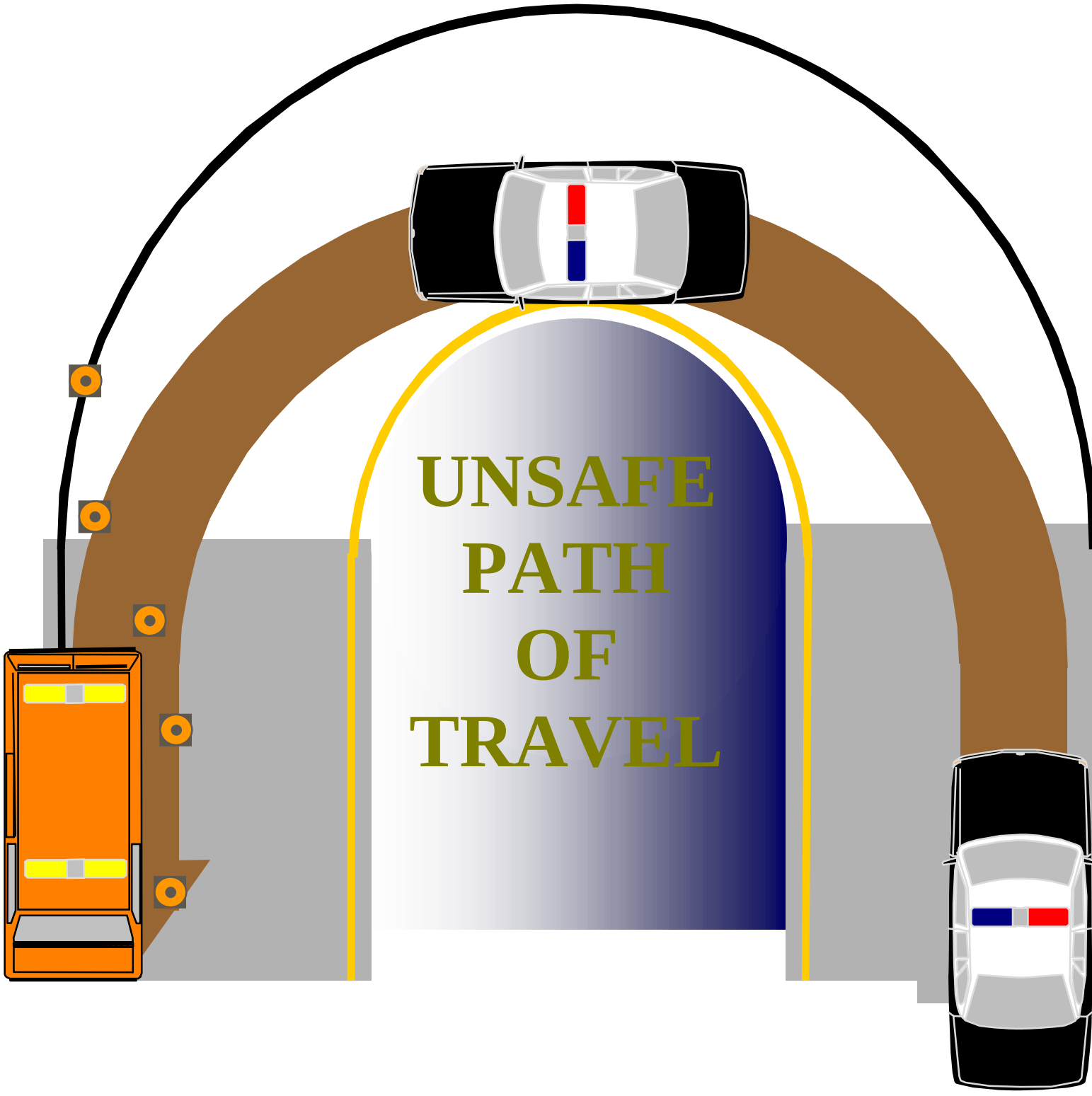
Consider this: the majority of driving problems occur when the tires are not pointed straight ahead and the vehicle is trying to maneuver. If you are at a greater risk when turning, then your goal should be to travel in safe, straight lines.

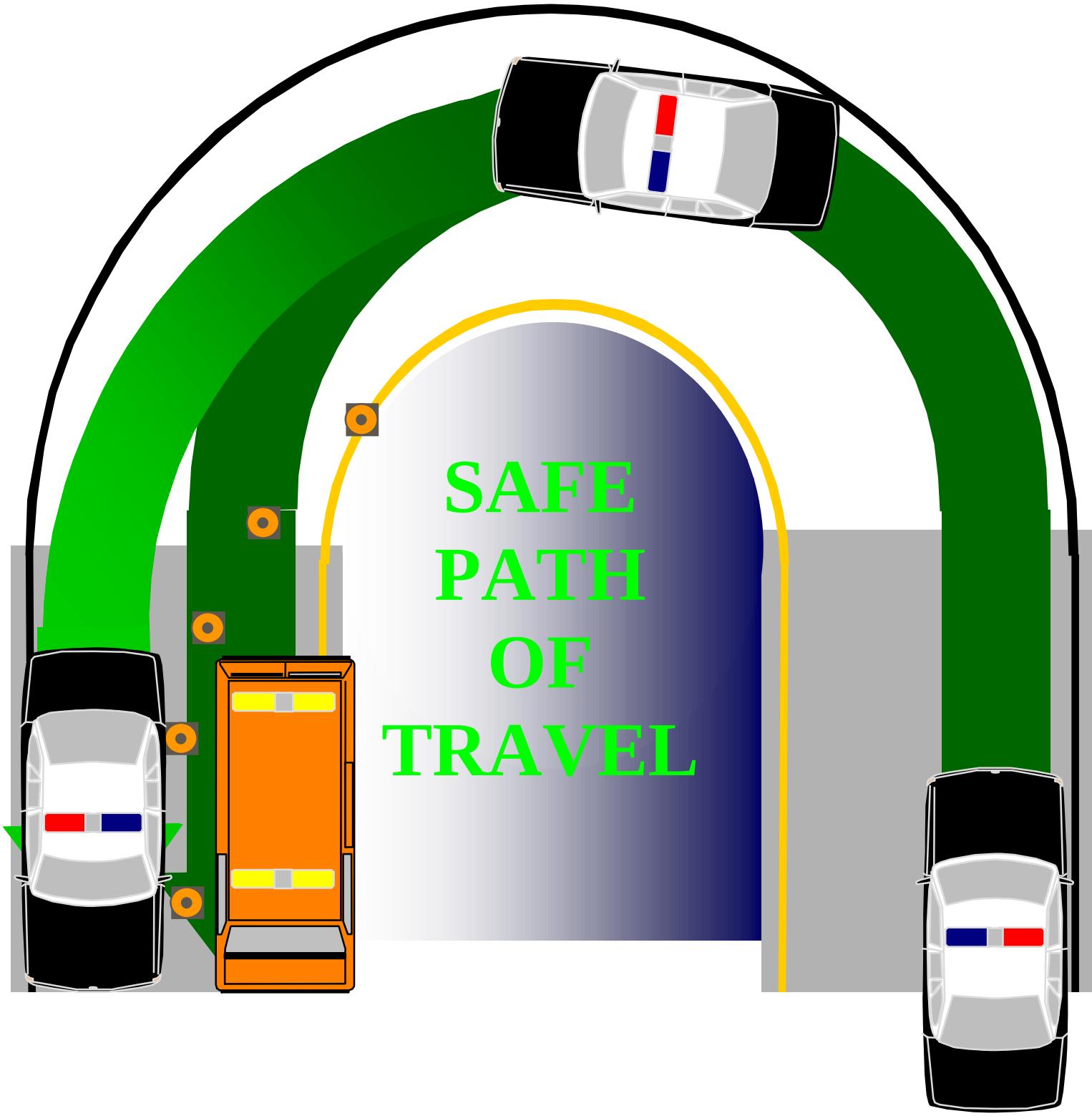
The corner diagram here depicts the outside-outside-inside (or high-high-low) cornering line. Another way to mentally think of this line is to set up as wide as possible in your lane and drive as wide of a radius as you can to an inside exit.



This diagram indicates both lines through the same turn. Notice that the high – low – high line has a potential conflict when a parked or disabled vehicle is placed in the center of the turn.

The lines depicted below are for a 180 degree turn, using the same cornering theories as the previous page.


UNSAFE
PATH
OF
TRAVEL


SAFE
PATH
OF
TRAVEL

Proper cornering techniques combine braking, steering, and acceleration. Set up as wide as you can safely do so and approach in a straight line.

Brake before reaching the turn, using less brake pedal pressure a little sooner while you are approaching in a straight line. As you begin feeding in the steering necessary to complete the turning maneuver, trail off of the brakes, replacing the foot brake with steering brake. Keep your eyes up, look through the corner for the exit and steer for it. Smoothly accelerate as you take the steering out. Exit to the inside of the turn as safely as possible.

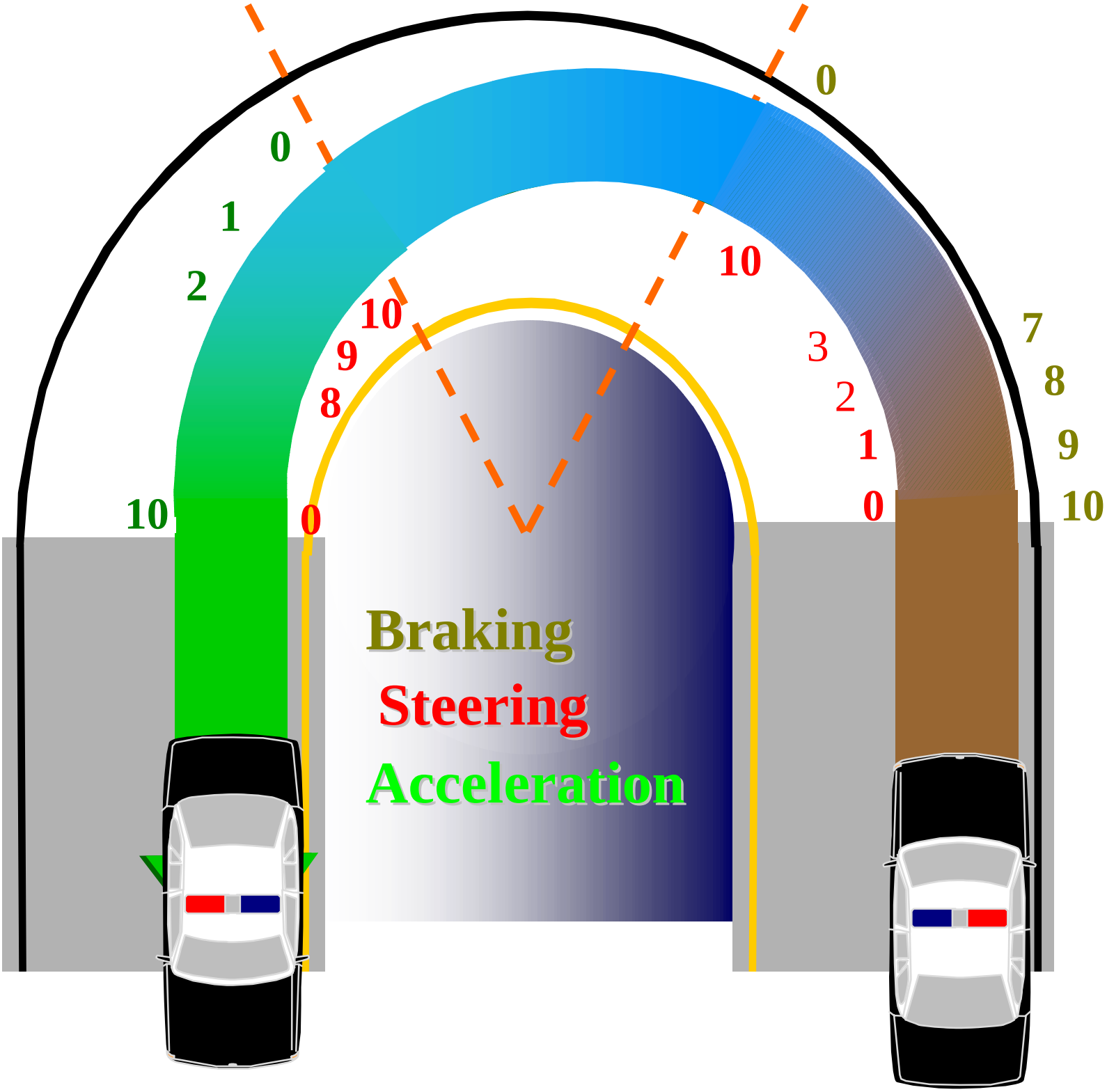
Remember anytime you have the steering wheel turned other than straight ahead, you are scrubbing off speed (inducing a braking effect through friction generated by the front tires).

(SEE DIAGRAM ON FOLLOWING PAGE)

Trail Braking

Helps keep the weight on the front tires as long as possible, increasing the effectiveness of the steering.

Balances out the effect of the steering braking effect and braking induced by the vehicle brakes.


0
0
1
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10
10
9
8
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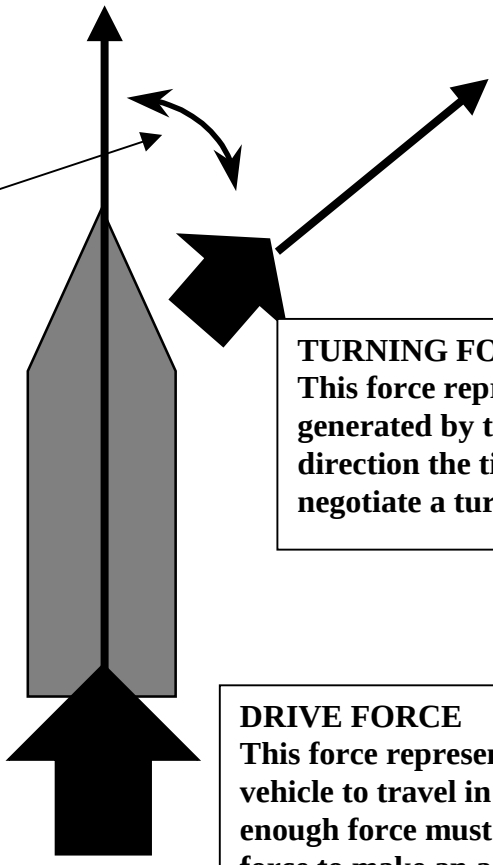
Braking
Steering
Acceleration

DYNAMICS OF TURNING

As has been previously discussed, simply turning the front tires of a vehicle will induce a braking effect. The following diagram is used to help explain why this occurs and to help the driver begin to understand the effectiveness of the trail braking concept to help balance the vehicle.



SLIP ANGLE
When the angle between the lines representing the two forces exceeds 21^0, up to 30% of the vehicle's overall braking ability is induced through the front tires.

TURNING FORCE
This force represents the force generated by the front tires in the direction the tires are pointed to negotiate a turn.

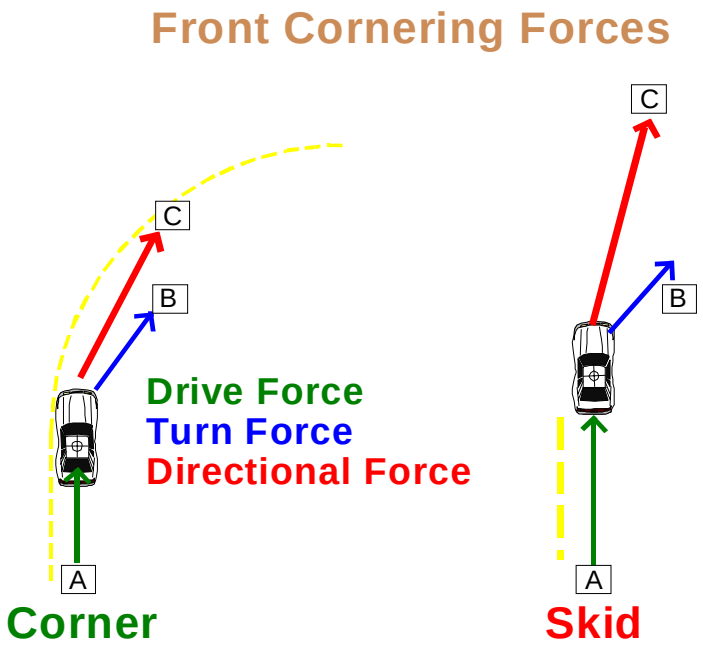
DRIVE FORCE
This force represents the tendency of the vehicle to travel in a straight line and enough force must be generated by the drive force to make an actual turn.

SKID / SLIDE CONTROL

Front Skids

The front end of the vehicle takes a wider path than desired. In engineering or automotive terms, this condition is called understeer. Basically, for whatever reason the front end of the vehicle has become unresponsive. Other terms which describe this condition of a vehicle include tight, pushing, and plowing.

Front skids occur when the drive force and turning force do not balance and the laws of physics dictate travel in a straight line.



A = Drive Force
B = Turn Force
C = Directional Force

In the above example, the drive force (A) is equal to the turn force (B) and the result is a smooth line around the corner. In the example with the skid, the drive force (A) has exceeded the turn force (B). The resulting directional force C is off of the roadway.

To fix Front Skids:

Straighten out the steering wheel to allow the front tires to regain rolling friction.

Turn back into the corner smoothly.

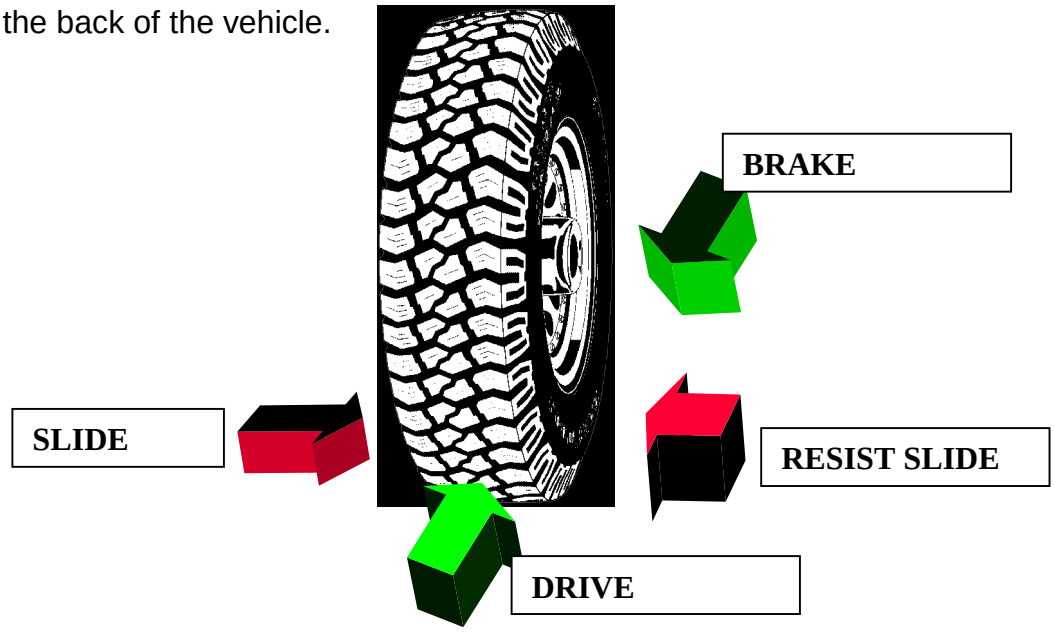
If you are on the accelerator, ease off. This will transfer weight to the front tires.

If you are on the brakes, ease off enough to ensure they are not locked up.

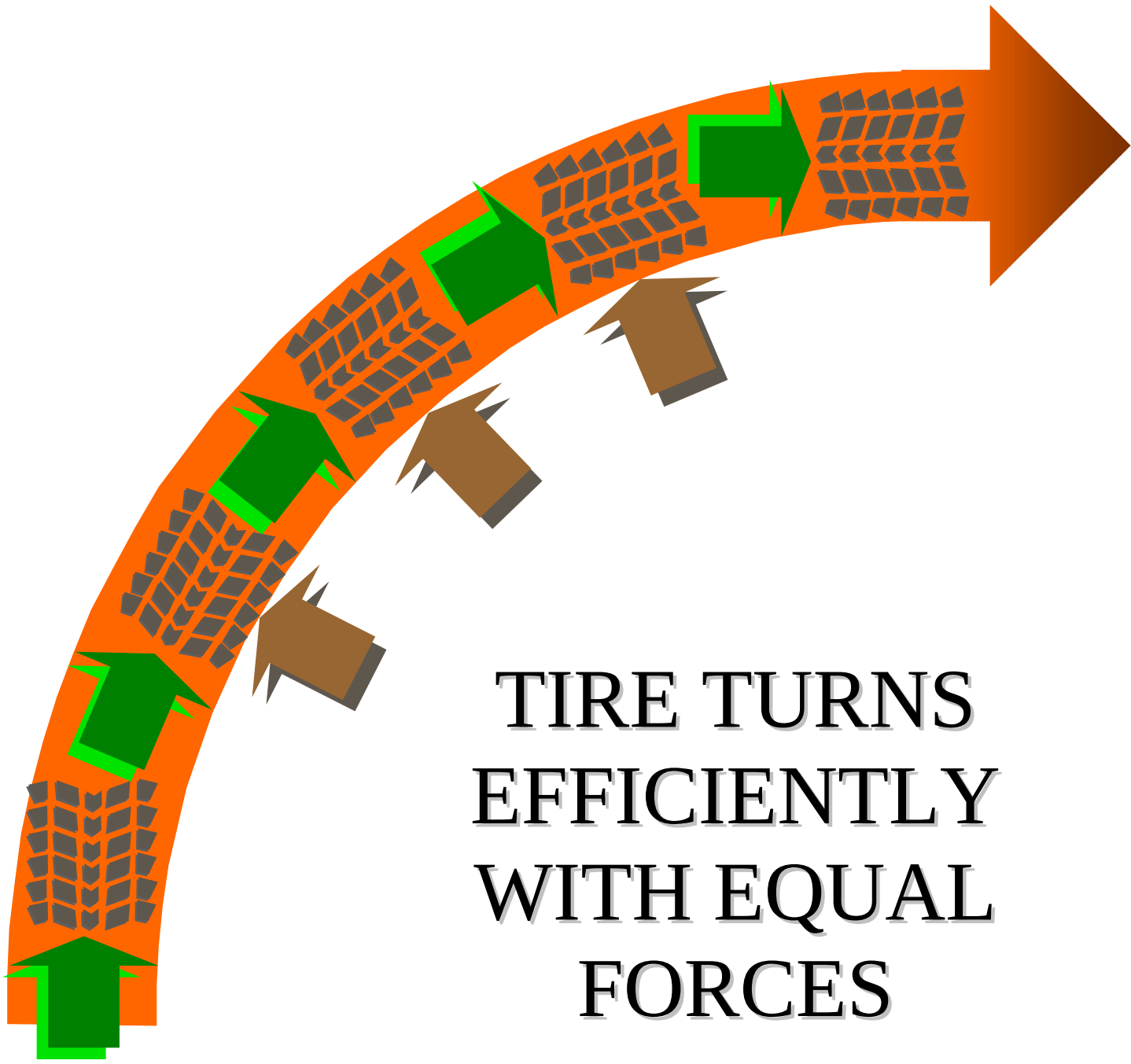
Rear Skids

The rear of the vehicle takes a wider path than desired. In automotive engineering terms, this is called oversteer. It is also called loose or fishtailing. Basically, the rear of the vehicle has become unresponsive.

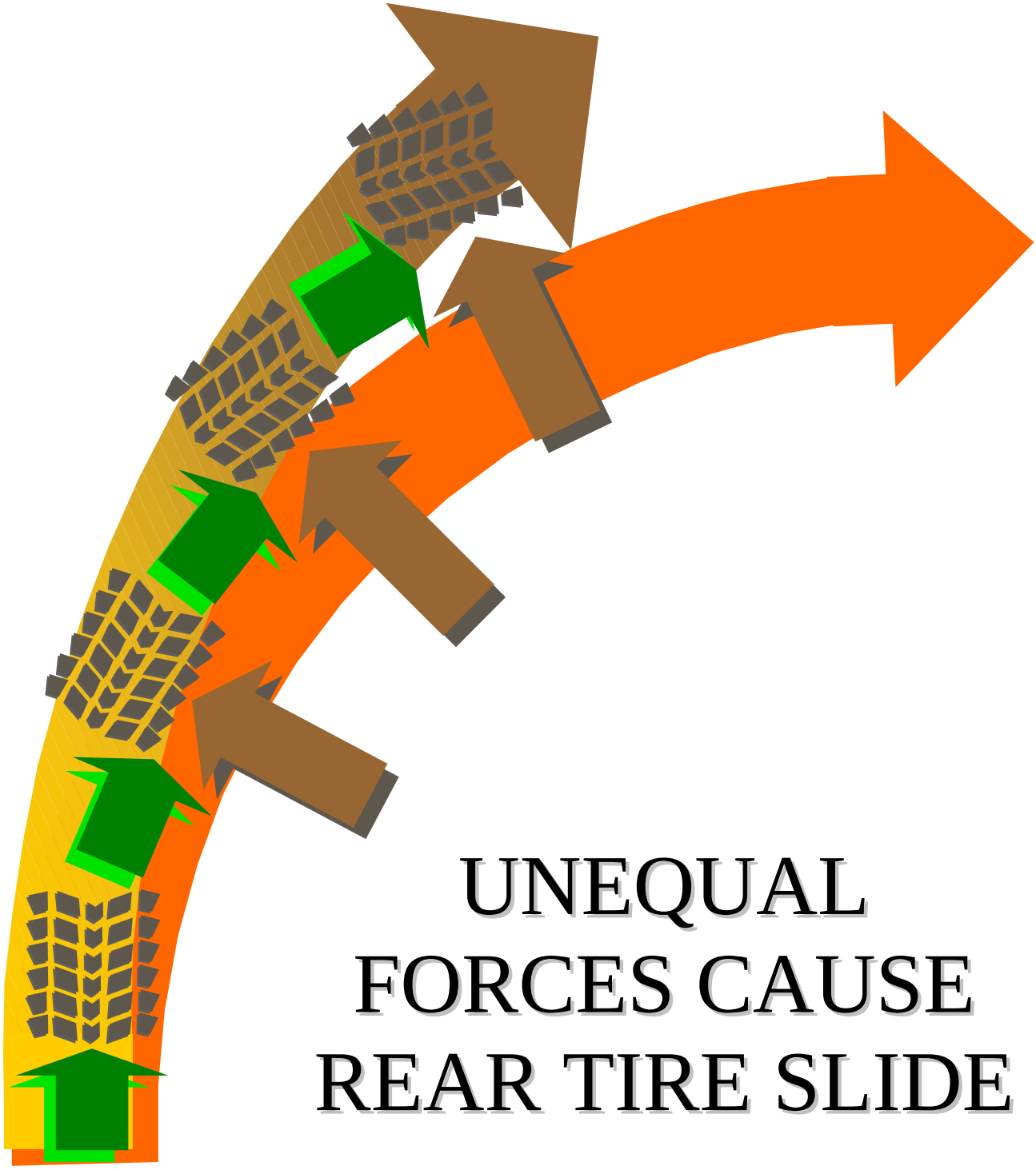
In order to understand rear skids, we need to examine the forces at work on tires at the back of the vehicle.



When a vehicle goes around a corner and forces are equal, the net result is a smooth corner. If the slide force exceeds the drive force, the vehicle will begin a rear skid. Remember that a sliding tire is faster than one that is turning, so the only thing the tire can do is attempt to travel past the front of the vehicle, causing the rear of the vehicle to skid.



TIRE TURNS EFFICIENTLY WITH EQUAL FORCES



UNEQUAL FORCES CAUSE REAR TIRE SLIDE

To fix Rear Skids:

Straighten the steering wheel quickly but smoothly.

If you are on the accelerator, ease off smoothly. This will minimize weight transfer to the front of the vehicle, which will tend to make the skid worse.

If you are on the brakes, ease off of them to transfer weight to the sliding tires.

Skid Control

In any skid or slide, try to do <u>less</u> of whatever you did to create the problem – and do it smoothly.

Backing

Backing accidents account for a large number of patrol vehicle crashes. For the most part, they are considerably less damaging to property, but they have the same consequences for the operator as any other accident.

Some of the consequences of an accident, whether backing or moving forward, include:

Embarrassment.

Reports or other paperwork.

Down time on the vehicle for repairs.

Backing Considerations

- Never park in a spot where you might have to back out in a hurry.
- Park in places that require the least amount of backing and always survey the intended path of your vehicle before backing.
- Back to the driver's side.

Backing Hand and Seating Position

Driver position while backing is somewhat different. Place your left hand at the twelve o'clock position with the palm against the steering wheel. Palm the wheel throughout the backing maneuver. You may wish to take your right arm and hook it over the seat to help stabilize yourself. Look over your right shoulder as much as possible, turning at the waist to reduce neck strain. If you need, stand up on your left leg and raise your buttock off of the seat. Drivers are warned to refrain from using their mirrors while backing. They do not reflect what is directly behind you.

Rules for Backing

1. **Never back unless you have to.**

2. **If you do back, do it slowly.**

3. **Back as if you expect to hit something.**

4. **Keep looking back until you have stopped.**

Police driving is one of the most demanding tasks an individual can be asked to accomplish. Operation of an emergency vehicle, whether during normal driving conditions or emergency situations, demands all of the skills and attention of the driver. The successful emergency vehicle operator must be capable of managing multiple tasks, both mental and physical, during operations.

The judgment a driver uses can be shaped by many factors. One of the most important factors is prior experience. A driver who has experienced multiple situations in a vehicle, whether during training or actual scenarios, will be able to adapt and apply learned skills to achieve success. Vehicle and driver limits are important in making critical decisions under stress.

The most important aspect of driving however, is the attitude the driver takes to the steering wheel. The most skilled vehicle operator in the world will not make sound, legal, professional, and ethical decisions if the attitude of the driver is impaired.

When you consider the attitude of the driver, several factors come into play. A successful driver must be able to look at himself and be willing to improve. New techniques and skills are always available and the person who chooses to believe they cannot learn will flounder.

Another important consideration is the ethical belief and behavior of the driver. Officers who believe in traffic laws and enforce traffic laws should follow traffic laws. This builds trust between other motorists and citizens when they see those who are sworn to uphold the law actually follow the laws. A person who takes the attitude “I am the law” or something similar is taking a very dangerous thought process into the vehicle with them.

Officers have often been accused of allowing their sense of authority dictate their driving pattern. If the speed zone is posted at 35, some have felt it was fine to drive faster than what is posted, as they are important and have things to accomplish. Professional police drivers must be courteous and continually set the example for other drivers on the roadway. This is a professional image that must be projected.

The public has a right to expect that officers are trained and equipped to manage themselves in multiple situations and this includes driving. Do not allow your own feelings of self-importance or authority to influence your professional decision making process.

PSYCHOLOGICAL FACTORS THAT CAN CHANGE OUR ATTITUDES AND EFFECT EVERYTHING WE WILL DO DURING OUR SHIFT.

Everyone has heard about having a bad day. Most have even experienced a bad day. A professional police driver cannot afford to be operating an emergency vehicle while they are having a bad day and that psychological mindset is foremost on their mind.

Situations at home can include family fights, disagreements over financial situations, family illnesses or deaths, problems with children, and a myriad of other things. You may have had a contact with a violator that did not go well, you may have just been yelled at for something beyond your control, or you may have just finished going over something with a supervisor that left you feeling angry or depressed.

Even too much joy can alter your thought processes enough to influence your thinking.

You will never be able to completely close the door on these psychological factors, but you can function if you simply realize the impact they have on your professional performance. There may be times when you need to take a few extra minutes and gather your mental processes before operation of a vehicle.

Attitudes can be changed.

The great thing about attitudes is that they can be changed. Adopting new habits and good attitudes do not come easily however. If you truly want to change an attitude, it will take a lot of hard work and a lot of self-discipline. You must commit to the change and be ready for the inevitable challenge making the change.

PERSONAL AND VEHICLE LIMITATIONS

Another critical component of the decision making process for the emergency vehicle operator is the limits of personal skill and of the vehicle. An operator who always drives at the very edge of their personal or vehicle limits is going to become involved in an unfortunate driving incident of some type.

A driver needs to identify their personal limits and then drive at 70 – 80% of that limit. This leaves the driver room to correct for unanticipated or unseen events in the driving environment.

Likewise, the driver needs to operate the vehicle within the limitations and specifications of the particular vehicle. An officer assigned a vehicle such as a Camaro will be able to drive differently than one who is assigned a more traditional sedan. The danger really occurs when the Camaro driver is placed into a sedan which has less handling capability and tries to use the same speeds

and style as when operating the higher performance vehicle. Again the 70 – 80% range for operation is a target area for safe and effective operation of an emergency vehicle.

Environment

A professional police driver must be able to function in all types of environmental conditions. Officers are expected to respond to all types of incidents using good roads, bad roads, and sometimes even no road at all. Officers are also operating in various terrain with assorted visual obstructions.

Bad weather does not preclude the officer from an emergency response. Officers must be prepared to drive in all types of weather conditions.

A final environmental concern for police drivers is the area of patrol. When a call for service is made, the officer has little or no control over the types of environmental hazards which will be present between the officer's location and the scene of the incident.

Vehicle

Emergency vehicles used in law enforcement are often somewhat inadequate to the task. Most vehicles are designed as passenger vehicles and have been adapted to a professional use. The seats are often smaller and crowded when all of the necessary equipment is added to the cabin of a police car. Police radios, mobile data or laptop terminals, light bar controls, video monitoring equipment and other tools are often placed in areas in the cabin which may influence the amount of space or control a driver will have in certain conditions.

It is important to look at your assigned vehicle and learn what it was originally designed for. Vehicles are typically built for very cautious and safe operation, rather than extended high speeds, rough handling, bumpy terrain that some officers find themselves in. Knowledge of your vehicle and its design intent will help the driver to determine vehicle limitations and additionally help the driver shape good decisions based on capability.

PRO-ACTIVE POLICE DRIVING

Instead of driving around waiting for something to happen that forces you to react, **drive in a manner which influences and controls the driving environment, encouraging other drivers to make anticipated movements.**

This concept of driving means that vehicle operators follow laws, use their turn

indicators and by virtue of vehicle positioning in lanes and the use of eye contact, communicate to other drivers what their intentions are. When other drivers recognize the intentions of a vehicle, they most often will react in an anticipated manner.

You must still be ready to react to unanticipated actions of other drivers but a pro-active mind tends to eliminate lag time and shortens the time needed to analyze situations and act on them in safe and efficient manners.

All drivers who are proactive have three qualities about them.

1. The driver is alert to all aspects of the driving environment and the vehicle.

2. The driver expects the unexpected event to occur and plans for it.

3. The driver always keeps identifying escape routes.

In order to achieve a desired outcome in driving, it is important to remember that pro-active driving is not offensive" to others. You are simply driving in a logical and visually predictable manner and preparing for outcomes of other drivers, whether they are the expected or unexpected.

DRIVING TECHNIQUES

There are many things a driver can do besides use good steering technique or braking skill to succeed in driving. Most of these techniques can simply be accomplished by discipline and a little determination to build good habits.

One of the most important things you can do is to maintain a cushion of safety around your vehicle. This means that you allow other drivers the ability to maneuver in front of, to the sides, and behind you and constantly check to keep this area open. When you have a cushion of safety, you have options in the event of an unanticipated event.

Look well ahead of your driving. Eye placement is critical to your success as a driver. If you look farther ahead, you will see potentially dangerous situations sooner and can begin a response that reduces your overall exposure and risk. A driver who is surprised by a sudden change in the environment typically responds with rough and sudden inputs to the vehicle controls, greatly increasing the chances of upsetting the balance of the vehicle and producing a skid or slide. Rough and sudden inputs are not consistent with our philosophy of platform management and anticipated driving. This reverts back to our pro-active thought process when we are driving.

Average drivers only look about 300 to 400 feet ahead of themselves.

You should develop the ability to look in excess of 1000 feet ahead.

Allows you to be alert for potentially dangerous situations which will require some form of driving action on your part. This may be an observation of brake lights on vehicles in front of you or it may be a large cloud of dust about a mile down the road. In any situation, information is survival and the sooner you have the information and can process it, the better your chances of survival.

The bottom line in looking ahead is the additional time to react that you will gain.

Escape Routes

Proactive drivers should always be looking for places to go that are safer than being involved in a crash. This may mean the choice between striking various objects. If you do not currently find yourself identifying escape routes, you will need to work on it. Eventually you will find yourself doing this at a subconscious level.

Following Other Vehicles

Approximately 150,000 disabling injuries and as many as 500 deaths occur each year from accidents caused by following too closely. A safe following distance is one that is simply defined as this:

"If something happens immediately in front of me, I can stop safely.'

Sudden stops are usually caused by not scanning the roadway and being surprised by something which appears in the driving environment.

FOLLOWING DISTANCE

Following distances are critical to survival when driving. Establishing a good safe distance helps the driver maintain the cushion of safety we have already addressed. While most drivers on the roadway subscribe to a two second rule, professional police drivers should use a three second rule.

The three second rule is easy to implement. Simply watch as the vehicle in front of you passes a fixed object and then begin counting 1000/1, 1000/2, 1000/3. If you reach three prior to reaching the same fixed object, your following distance is appropriate. Should you reach the same fixed object prior to your count of 1000/3, then you are too close and should increase your following distance by

slowing down and allowing separation to occur.

The three second rule is a good rule for officers during normal driving conditions such as daytime and dry pavement.

When conditions change, so should the following distances. During night driving and / or wet pavement operations, the distance should be extended to six seconds.

When conditions involve driving on gravel roads or in winter snow and ice conditions, the following distance recommended is nine seconds.

This simple 3 – 6 – 9 rule for establishing following distances will help the officer maintain safety. There are very few times during emergency vehicle operations when it is necessary to be closer to violators. Officers who subscribe to the techniques and skills of emergency vehicle operations can easily close distances if it becomes necessary.

ADVERSE CONDITIONS

Adverse driving conditions are faced by law enforcement officers all of the time. Officers are expected to respond to vehicle roll-overs and slide-offs in the same icy conditions as those faced by other drivers, yet they are expected to avoid incident during the response. Two simple considerations, both of which are easy to do, will help to insure the safe arrival at a scene.

1. Slow down.

2. Increase your following distance.

COVER THE BRAKE

Covering the brake is a technique which drivers should use when they are approaching and traversing intersections and when they are not sure of the actions of other drivers.

The driver simply removes the foot from the accelerator and positions the foot in a position directly on the brake pedal but does not activate the brakes. This promotes slowing and also reduces the amount of reaction time if brakes are needed.

MIRRORS

As you drive, you should check your mirrors every three to five seconds. This will allow you to be completely aware of all of the traffic and conditions around you. Remember your mirrors should be set in a position which will allow you to obtain maximum vision around the vehicle with a minimum of head movements. Also remember that mirrors are only an aid and if you see something which concerns you, you should also physically turn your head in the direction of the concern and verify what your mirrors are telling you.

With regard to mirrors, you need to be completely aware of the mirrors other drivers use. We have become accustomed to awareness of our blindspots, or areas the mirrors do not afford visual assistance. We need to become aware of our presence in the blind spots of other drivers. You must be able to see the other driver in the rear view mirror to be assured that driver can see you.

There are times when it becomes advantageous to drive in the blind spot of another vehicle. You should only do this when you are attempting to view activity in other vehicles for law enforcement reasons. This is often a good place to be to view the actions of passengers. If you choose to drive in a blind spot, you must be ready to implement an emergency driving action to avoid a collision, should the other vehicle operator suddenly begin to move towards you.

STOPPING BEHIND TRAFFIC

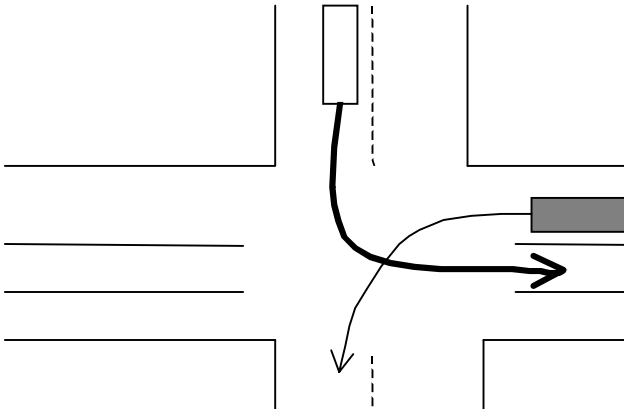
When you are in traffic and come to stops at intersections or in other traffic conditions, you should develop the habit of stopping back from the other vehicles or the stop line. You should try and position your vehicle where you are able to observe the rear tires of the vehicle in front of you. This creates a gap you can use to act if another driver comes up quickly from behind or you need to initiate an emergency response and move into another lane.

Even in situations where there are no other vehicles, you should develop the habit of stopping back from stop lines. This will help you maintain the necessary habits and will still allow for unforeseen events.

TURNING LEFT AT INTERSECTIONS

When you come to an intersection and need to turn left, or even when you are in a continuous left turn lane, you should keep the wheels of the vehicle pointed straight ahead until you begin to move. This will help keep you from being pushed into oncoming traffic in the unlikely event you are struck from behind.

By stopping back, even when turning left, you also reduce exposure to risk for yourself and other drivers. In the diagram below, the gray vehicle stopped back and the white vehicle is able to turn into the correct lane. If the gray vehicle pulls ahead too far, the white vehicle is forced to veer into the other lane.



HEADLIGHTS

Your headlights should be turned on anytime you have reduced visibility. A good rule of thumb is to turn on your headlights anytime you turn on your windshield wipers.

HYDROPLANING

- Can occur at speeds as low as 30 mph.
- Watch for a tire patch in your rear view mirror.
- Watch vehicle in front to see if there is a path already cleared and drive in it.
- Best way to prevent hydroplaning is to slow down.

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TRAFFIC CRASH KILLS TWO OREGON STATE POLICE TROOPERS

ON TUESDAY, SEPTEMBER 2, 1997 AT APPROXIMATELY 6:00 PM TWO OREGON STATE POLICE TROOPERS WERE KILLED IN A TRAFFIC ACCIDENT WHILE ON ROUTINE PATROL NEAR CRESCENT OREGON IN CENTRAL OREGON.

SGT. XXXX, AGE 46, AND TROOPER XXX, AGE 23, WERE JUST ARRIVING TO ASSIST ANOTHER TROOPER WITH AN ACCIDENT INVOLVING AN INTOXICATED DRIVER WHEN THE CRASH OCCURRED. THE OFFICERS HAD JUST ARRIVED AT THE SCENE OF THE ACCIDENT AND HAD PULLED OFF THE ROADWAY ONTO THE RIGHT SHOULDER AND BEGAN MAKING A LEFT TURN WHEN THEY WERE STRUCK NEAR THE DRIVERS DOOR BY A LOADED WOOD CHIP TRUCK.

BOTH OFFICERS DIED AT THE SCENE.

SGT. XXXX WAS A 24 YEAR VETERAN OF THE OREGON STATE POLICE. HE WAS MARRIED WITH TWO CHILDREN. TROOPER XXX HAD BEEN WITH THE OREGON STATE POLICE FOR ALMOST TWO YEARS. HIS FATHER IS A SENIOR TROOPER WITH THE OREGON STATE POLICE.

Turn Arounds

Turning around is one of the most visible activities patrol officers perform an a daily basis. It is also one of the most dangerous.

This course addresses three different types of turn arounds.

U Turns

Two Point Turns

Three Point Turns

The primary factor to consider for any type of turn around is the visibility the area is going to provide for the officer to assure traffic is clear enough to

complete the turning maneuver. Officers should avoid turning around on hills, in the middle of corners, in depressions, or other areas where visibility is hampered.

U Turns

A U-turn is one which the officer can complete with one continuous turning movement without stopping. Officers should visually clear the area using both mirrors and then physically looking prior to beginning this maneuver

Two Point Turn Arounds

These turns utilize driveways or wide spots along the roadside in areas where the officer is not able to conduct a U-turn.

Example:
Roadway on the right.

The officer pulls past the drive or wide area and then carefully backs into the spot. After clearing traffic, the officer can drive away in the other direction.

Example:
Roadway on the left.

The officer pulls directly into the open area on the opposite of the roadway and then carefully backs onto the shoulder after clearing traffic. The officer then drives away.

Three Point Turn Arounds

1. **Y-Turn**
2. **Bootleg**

Y Turn

The Y turn is accomplished by turning as far as possible from the right lane to the left lane. The officer then backs carefully into traffic until it is clear to proceed down the highway.

Bootleg Turn

The bootleg turn is accomplished by pulling onto the shoulder as far as possible. The officer then backs across the roadway carefully towards the opposite shoulder until it is clear to proceed.

The safest type of turn around is the U-turn. Remember that the less you expose yourself to risk, the safer the maneuver will be.

RISK REDUCTION AT INTERSECTIONS

Intersections are the most likely areas for emergency vehicle collisions to occur. Nationally almost 37% of all crashes are intersection related.

Emergency vehicles which crash in intersection related incidents makes an alarming jump to 50%. Due to the types of driving emergency vehicle operators engage in, risks increase in intersections.

Emergency Vehicle collisions occur at intersections for several reasons. Some of those reasons include:

1. Restricted Visibility

2. Emergency Vehicle Operator misjudging available clearances in traffic.

3. Emergency vehicle operators misjudging vehicle speed as they approach the intersection.

4. Other motorists become confused by the emergency equipment and either stop in the way or move in an unpredictable manner.

5. Motorists fail to hear or see the emergency vehicle as it approaches.

6. Two or more emergency vehicles enter the intersection at the same time.

PREVENTION / AVOIDANCE SUGGESTIONS FOR INTERSECTIONS

In order to reduce risk when approaching and traversing intersections, operators can implement several of the following strategies:

1. **Avoid dangerous or congested intersections as much as possible.**

2. **Slow down when approaching and traversing an intersection.**

3. **Know your speed at all times.**

   The speedometer is the most important gauge for safe vehicle operation.

4. **Cover the brake when approaching and traversing intersections.**

5. **Signal intentions well in advance of the turn to help confused motorists.**

6. **Avoid using oncoming lanes or continuous turn lanes.**

7. **Avoid passing on the right, even if the lanes appear to be open.**

8. **Consider running with the flow of traffic and not using emergency**

lights.

9. Increase following distance from other emergency vehicles.

READING THE ROAD

Concrete Roadways

Concrete is a supportive surface. When it is new, the surface is very abrasive and provides excellent traction. As it ages, concrete becomes less adherent and more conducive to hydroplaning if wet. Concrete is very light in color, almost white when it is new. As it ages, the color becomes darker as the rubber from tires builds up on the concrete.

Asphalt Roadways

Asphalt is a distributive surface. When it is new, the surface is slick and oily and not conducive to good traction. As it ages the aggregate rock begins to surface as the oils are pushed down and away. This results in increased traction. New asphalt surfaces are dark, often black. As this surface ages, the color lightens to gray.

Reading the surface of the roadway will allow the driver to anticipate changes in the traction and driving environment. This takes practice and discipline but can become second nature. A good rule of thumb is this:

The lighter the driving surface is in color, the better your traction will be.

Night Driving Adjustments

Driving at night presents its own set of problems. Nearly everything in the environment has been artificially enhanced for better visibility at night. Things such as reflective paint and tape enhance road signs and markers. This often has the unfortunate result of tricking the driver to believing visibility is actually better than it is in natural daylight.

Your night vision is not as effective as your vision in daylight. You lose most of your secondary vision and the peripheral vision is severely hampered.

Drivers must mentally make the adjustment for night driving and slow down. They need to remember to scan from side to side and not attempt to rely on peripheral vision. This will help reduce surprise and make driving inputs to the platform much smoother.

Road Hazards

Road hazards can come in many forms. Some of the most common include animals, debris from other vehicles which has fallen on the roadway, potholes, or chatter bumps.

The driver should always attempt to visually locate the object in plenty of time to slow down and maneuver safely around the hazard.

Sometimes a hazard suddenly presents itself. This is where the driver must combine a sound decision making process with good driving skill. It is not worth the risk of personal injury or property damage to drive off of the road to avoid striking a small animal. It is preferable to strike the animal and maintain control of your vehicle. This will require you to commit to this concept before it ever occurs and be mentally ready for the potential outcome to the animal.

When a driver determines to strike a hazard such as a small animal, pothole, or other debris, the driver can utilize the driving philosophy of weight transfer to successfully minimize damage and maintain control. When the hazard is observed and it is determined it will be struck, the driver should go to the brakes as hard as possible. This will have the effect of shifting weight forward dramatically and "loading" the suspension components with energy. A split second prior to impact, the driver should "pop off" of the brakes. This has the effect of allowing all of the potential energy which was placed in the suspension components to rapidly release and weight transfers to the rear of the vehicle. The vehicle can then actually float over the hazard.

Chatter bumps often occur on gravel roads or asphalt roads in areas where heavy braking occurs. They can be at the approach to a turn or corner or at an intersection. If the driver notices ripples or bumps in the driving surface, the vehicle should be off-set to one side or the other to improve braking and keep the platform flat and stable.

Efficiency as A Driver

Knowing your jurisdiction will make reading roads and knowledge of potential hazards easier. The last thing a driver needs to do is be in an area of unknowns while trying to drive in an emergency condition.

PURSUIT AND EMERGENCY RESPONSE DRIVING

Emergency response and pursuit driving is one of the most dangerous and unpredictable activities law enforcement officers engage in. Due to the dynamic nature and the often unpredictable actions of others, coupled with the extreme mental and physical demands on those involved, these activities can often result in serious injury or death to those involved or even to innocent individuals who may find themselves in the course of the response or pursuit.

The risks are extremely high due to the these demands, but the single greatest contributor to risk in pursuit or emergency driving is <u>speed</u>.

As a police officer, you will find yourself involved in two very different types of pursuits for two very different sets of circumstances.

The first type of pursuit you may find yourself involved in is simply a ***Pursuit of Time***. This type of pursuit is more typically referred to as an ***Emergency Response***, but the effect is the same. The dictionary refers to a pursuit as an attempt to overtake or capture. In essence, an emergency response is an attempt to overtake time.

The second type of pursuit you may become involved with is the ***Pursuit of Person (or vehicle)***. This is the type of pursuit conjured up by images from television and movies. Even the names used to describe this law enforcement activity (high speed chases, etc.) help to create the dangerous mental image of this activity. We will spend most of our time on issues surrounding this situation, but the driving skills and decisions are relevant to either activity.

Classify the Violation

One technique that will help you determine what to do in the initial phases of a vehicle pursuit is to identify the nature of the violation you have just observed. You will have policy guidelines to assist you in this, but a very simplified method of thinking is to classify the violator by risk.

Non-Hazardous violators are those who have committed a traffic infraction, equipment violation or some other low level, low threat driving error. You should not infer that a pursuit involving a violation which has been classified as non-hazardous is without risk. This simply means the initial reason for the stop was not a serious risk to the safety of the violator, public, or police officer. Hazardous violators are those whose very activity is more extreme from the on-set. This suspect may have been observed committing a reckless driving act, is a known felon, was just involved in a serious felony crime, or other incident. From the beginning, this type of violation exposes everyone to a higher degree of risk of injury or death.

By prioritizing the violator, you will be able to gauge how much additional risk should be extended in that pursuit.

In any circumstance, the risk should never extend past the point of due regard for the safety of others.

The suspect does not change to the classification of Hazardous from Non-Hazardous due to the driving pattern which occurs once the pursuit is initiated. This driving pattern is a result of the pursuit and increased risks in

the driving pattern can be reduced by voluntary termination on the officer's part at any time.

RISK

Would you be willing to pursue a non-hazardous violator for extended periods of time at a high rate of speed?

What about the hazardous violator?

FACTORS TO CONSIDER IN CONTINUATION / TERMINATION DECISIONS

When an officer becomes involved in a vehicle pursuit or emergency response, the officer must immediately begin to apply the agency policy and weigh those policy statements against the observations and information available when the pursuit or response begins. Most policies will provide the officers with several statements and considerations to assist in this process.

The following factors are some (most likely not all) of the consideration factors an officer must apply in an emergency response or vehicle pursuit:

1. Speeds involved
2. Time of day
3. Traffic pattern and conditions

4. Condition of the violator and police vehicles
5. Nature of the violation or call
6. Route of travel
7. Identity of suspect or violator is known
8. Physical and mental condition of the officer and suspect
9. Weather
10. Availability of other units
11. Escape routes
12. Type of police unit involved (marked vs. unmarked, motorcycle, SUV)
13. Agency policy

When officers begin to weigh policy against the information and observations available, officers cannot assume that an individual observed for a traffic violation is involved in something more serious because they are fleeing.

Officers must rely on what is known to be true not what they think might be true.

In other words, if the circumstances justify increasing risk during a pursuit, that justification must be based on what is known to be true at the time.

PURSUIT TACTICS

Slack Pursuit

Slack pursuit should be the very first choice of actual tactics applied during a pursuit. Slack pursuit is simply "slacking back" or opening a greater following distance with the fleeing vehicle by easing off of the accelerator.

If you perceive the individual you are chasing is either inexperienced or simply wants to maintain a comfortable lead ahead of you, slacking off will most likely serve to reduce the overall speed.

If the violator wants to establish a distance (comfort zone) and can establish the distance at 60 mph rather than 80 mph, the continued pursuit will be safer due to the reduction of speed. If they do not slow and you elect to continue the pursuit your skills will allow you to maintain contact as necessary until

other tactics may be implemented.

The recommended following distance in a pursuit is at least four seconds, but should generally be six seconds or more. If the weather conditions or other environmental factors would give cause for a greater following distance when there is no pursuit, increase the following distance even more.

Vehicle Positioning

As the officer begins to open up a following distance by conducting a slack pursuit, the officer should position the patrol vehicle into a position of advantage. Simply moving into a position as far to the left as practical, while maintaining lane discipline, will create several advantages for the police officer.

PURSUIT POSITION (REAR VIEW)

PURSUIT POSITION (FRONT VIEW)

The advantages of getting into the off-set left pursuit position are:

1. Maximized view of police unit for oncoming traffic.
2. Maximized view into fleeing vehicle.
3. Maximized effectiveness of all police unit lights.
4. Increased options for police unit to implement evasive maneuvers.
5. Makes suspect more prone to right hand turns.

Other Vehicular Use of Force Considerations

As with any pursuit tactic, the officer must have training in the tactic and the policy support. This becomes absolutely critical when additional force may be needed to stop a fleeing suspect.

The officer needs to apply agency policy and 4th amendment decision making to any use of force, even when the instrument of that force is a vehicle. The same decision making process can be used for determining what types of vehicular force are viable as determining whether to apply a chemical irritant to a suspect.

Spike Strips

Spike strip systems come in a variety of makes and models and each system has its own set of advantages. Generally spike strip deployments are considered relatively low level uses of force and do not fall in the deadly force area. Spike strips can be deemed the use of deadly force if they are deployed in poorly selected areas which increase the likelihood of a serious crash to the fleeing vehicle or other traffic.

Spike strip deployment must be supported by policy and it is recommended that officers who are equipped with and deploy spike strip systems are trained in their use and know the deployment tactics and policy of the agency.

Channelization

Channelization is a technique in which officers offer or deny routes of travel to a fleeing suspect. This technique requires good communication between all units as some officers will be exposed to the path of the fleeing vehicle.

This tactic is often used to block major intersections and keep uninvolved traffic out of the way. It is also used to keep suspects from leaving freeways and entering more populated jurisdictions.

Forced Compliance

Forced compliance tactics are substantially more risky to officers, suspects, and other traffic. These tactics involved contact between the police vehicle and the fleeing vehicle and often result in substantial damage to one or both vehicles.

Any use of a forced compliance technique must be preceded with training in the application of the tactic and have policy support.

Boxing / Containment Techniques

Boxing and containment are tactics in which police units surround the fleeing vehicle and bring it to a stop.

PIT

This tactic is initiated by the police vehicle and induces a spin which dissipates the forward energy of the fleeing vehicle. The vehicle is then contained with various takedown procedures.

Lethal Options

Any tactic which is likely to cause serious physical injury or death to the occupants of the fleeing vehicle will be considered a lethal option. As with other forced compliance stops, the implementation of these tactics require training and policy support.

Tactics such as ramming and roadblocks are examples of lethal options.

LEGAL CONSIDERATIONS AND ISSUES

As police officers we have a moral as well as a legal duty towards the public we serve. We are obligated to operate our vehicles in responsible manners and to do so within the law. If we overstep those boundaries we are likely to find ourselves defending actions in criminal or civil courts, but even more important…if people are afraid they are going to be hurt or killed by the police in a pursuit or emergency response, we have lost sight of our main responsibility.

VICARIOUS LIABILITY

Vicarious liability is a legal term based on a theory called Respondeat superior. This theory simply means that the higher authority must respond to claims brought against one of its agents.

This means that Sergeants are responsible for the actions and decisions of officers on their shifts, Lieutenants are responsible for their Sergeants, etc. This legal theory is often applied in civil actions where allegations of police negligence are being brought.

Vicarious liability is not limited to the relationship of an employer with an employee or a supervisor relationship. Any relationship which can be articulated is subject to the application of vicarious liability.

Officers often complain that supervisors “terminate” or “call off” their pursuits when the officer believed it should continue. Often this legal theory is the basis for such a decision. Officers need to realize that it is easy to get caught up in the excitement of a vehicle pursuit and that the supervisor is most often at another location making a more reasoned decision based on the available information.
After any pursuit or emergency response, officers should get with their supervisors and others who were involved in the incident and conduct either a formal or informal review of the incident. This is the format officers should use to ask why a pursuit was terminated by another officer or supervisor.

Post-incident reviews of this nature will help to prevent future communication problems and help all parties establish better decision making strategies. This type of incident review will help reduce exposure to future risk associated with the theory of vicarious liability.

RESPONSIBILITY

The tactics and decisions an officer makes or a supervisor allows during the course of a pursuit should be implemented with safety as the highest priority. Apprehension of the suspect is important, but only after assuring all possible and practicable safety measures have been tried.

In a vehicle pursuit or emergency response which ends in tragedy, one of the first questions others will ask is “Would a reasonable officer have acted the same in similar circumstances?”

Balancing a Decision to Terminate / Continue

Develop the same thought processes for emergency response driving, vehicle pursuits, and the use of vehicular force that you use when initiating a contact on a pedestrian stop or during an arrest situation. In a scenario where the use of a firearm is imminent, officers always consider such things as shooting backgrounds. In a scenario where officers are operating in an emergency response or pursuit mode, the stray rounds are 4000 pound vehicles and they have 1000 times more foot pounds of energy than a bullet. If you would not draw and shoot into a crowd, why would you drive through one?

The decision to discontinue an emergency response or to terminate a vehicle pursuit should always be present in the officer’s decision making process. This will keep the public from fearing us more than the violator and make the driving environment safer for all concerned.

LEGAL ISSUES

Not only must we adhere to state laws, but also to case law rulings and to department policy. This course continually emphasizes the critical need of officers to know and understand their agency policy.

Liability / Risk Exposure

If you operate within the boundaries of the vehicle code, criminal code, case law, and agency policy, the chances of a judgement in either a criminal or civil action is greatly reduced.

Officers should remember to run slack pursuits and use good positioning of the police vehicle, continually assess the situation and balance what information is known against the factors for continuation or termination of a pursuit, and most importantly:

Never let the pursuit extend past the point of reckless disregard for the safety of others!

ETHICAL RESPONSIBILITES

Although you may find the drivers training you are participating in somewhat difficult and stressful, it is mild compared to real life situations. One of the most serious decisions associated with emergency driving is when to initiate emergency driving. Most veteran officers will admit that during their early years as an officer, they quickly

developed an attitude that the violator they were pursuing was not going to get away from them. Those same officers might also tell you that it was difficult to terminate a pursuit for the same reasons.

Human nature dictates that it is not easy to refrain from taking a pursuit personally. The thought that the violator is not going to get away from me can become very strong if your experience level is low.

Ethical Dilemmas

1. ***Am I acting out of anger?***
2. ***Am I acting out of lust?***
3. ***Am I acting out of greed?***
4. ***Am I acting due to peer pressure?***
5. ***What would I do if my family were standing behind me?***
6. ***Is it worth my job?***
7. ***Is it legal?***

USE OF LIGHTS AND SIREN

Lights

The use of lights and sirens during emergency response or pursuit driving is critical. The very type of emergency equipment a vehicle is using is also important.

White light can be seen up to three times farther than colored lights and is often one of the colors used in a light bar combination. Blue lights are reserved for law enforcement vehicles.

Because white lights can be seen in all lighting conditions, the alternating high beam or wig-wag lights are extremely effective during daylight hours. Officers should be cautious when using wig-wags at night as they can be extremely blinding to oncoming traffic if they are directed that way.
Many police vehicles are equipped with spot lights or takedown lights in the light bars. These lights are designed for stops. They can be used during vehicle operations, but are most likely going to present more lighting hazards to other traffic than the benefit they might add.

When operating a vehicle in an emergency response or vehicle pursuit, officers should refrain from using the four-way hazard flashers as an additional lighting source. The use of these lights will prevent the officer from

communicating driving intentions with turn signals.

Siren

Siren sound travels in a cone shaped pattern. The higher the frequency of the siren, the narrower the cone is shaped. High frequency sirens are more effective when officers are trying to project sound over greater distances. Officers can effectively select higher frequencies and mix them with lower frequencies as they approach and clear intersections. This change in frequency will help alert some who may not hear one frequency or the other.

Siren sound actually bounces and rebounds off of solid objects. This tends to create difficulty for others in locating the source of the sound. Officers who operate in city environments are especially prone to this condition and should reduce their speeds accordingly.

It is possible to outrun the effectiveness of a siren. At 60 mph you will be within 100 feet of the car in front of you before sound reaches the other car. If an officer uses a siren for an extended period of time, the officer may begin to feel lulled or hypnotized by the sound. This effect is called sirenside and is a potentially fatal condition. The officer begins to reach a state of relaxation or comfort with the siren sound and the mental edge begins to go away. This can cause the officer to make decisions which are not well-reasoned.

Officers can combat the effects of sirenside by simply varying the pitch from time to time. Officers can also turn the siren off for short periods of time when its use is not needed. In all applications, officers have to discipline themselves to breathe and to scan the roadway.

In general, when you activate your emergency equipment, but especially your siren, you should discipline yourself to ease off of the accelerator slightly. The natural tendency is to apply pressure and go faster. Watch out for this tendency. Your skill will allow you to maintain contact and the advantage you gain from the slight reduction in speed will allow your decision making processes to function.

The use of emergency equipment is addressed in the codes. In addition to the codes, you must comply with your agency policy with relation to the use of emergency lights and sirens.

SURVIVING A COLLISION

Try to locate something soft to hit when it becomes apparent a collision is inevitable.

Try to direct the vehicle into glancing blows, rather than head-on collisions.

Priority System

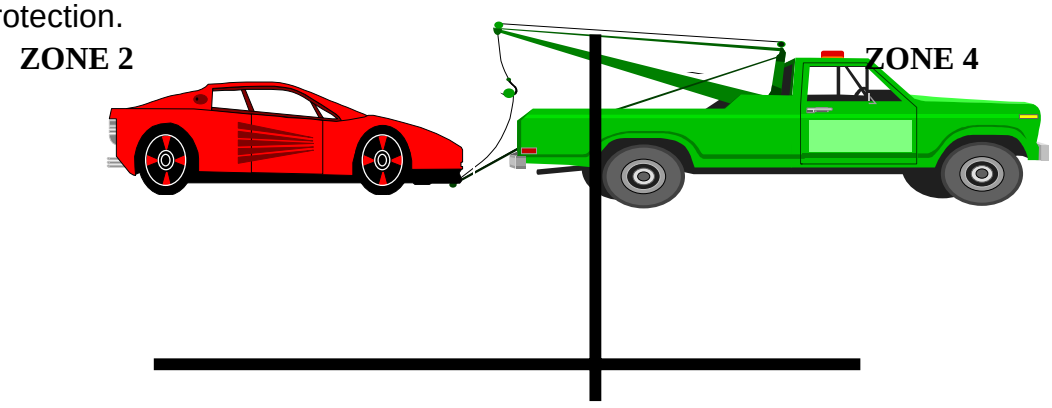
1. Preserve Life **2. Reduce Injury**

3. Minimize Property Damage

Think yourself through a collision! Do not give up on the steering wheel and try to avoid jamming or jabbing the brakes.

Zones of Protection

A vehicle can be broken up into four zones of protection.



ZONE 1

ZONE 3

If you are going to have a crash in the rear half of the vehicle (zone 3 or 4), turn into the object just prior to impact. This will tend to create a spin.

If you are going to have a crash in the front half of the vehicle (zone 1 or 2), turn into the object just prior to impact. This will tend to create a spin.

Both of these concepts go against your instinctive reactions. It is imperative to think about these things prior to driving. If you wait until an event to begin your planning, you will not have the time to use your plan.

Try and have a long crash. Short, sudden impacts hurt. All of the energy of the vehicle is transferred to the object of impact rapidly. Long, drawn out crashes with the energy being dissipated over time is preferable.

After the crash get away from the vehicle. Wrecked emergency vehicles are a magnet for attention and the inattentive drivers may be drawn into another impact near the vehicle.

Above all ...DRIVE TO SURVIVE !!!

SUPPLEMENTAL INFORMATION

Physical Laws of Motion

The physical laws of motion were first discovered and articulated by Sir Isaac Newton in 1687. Each of these laws are absolute and effect the vehicles we operate today. Understanding of these laws will help drivers understand why vehicles act as they do in certain circumstances and may help a driver control the effects of these physical laws.

THE FIRST LAW

Every body continues in a state of rest or uniform motion in a straight line unless it is compelled to change that state by forces impressed upon it.

This is an example of inertia.

A vehicle once set in motion has a desire to continue moving in a straight line. In order to change the direction of the vehicle, we develop rotational friction with the front tires which compels the front tires to change directions

If rotational (rolling) friction is lost, sliding friction is induced and the vehicle will travel in the direction the center of mass was last headed.

THE SECOND LAW

The acceleration of a body is directly proportional to the net force acting on the body and inversely proportional to the mass of the body.

Application of this physical law on vehicles is actually quite simple. A vehicle with a large amount of mass and a small engine will not function like a vehicle with a small amount of mass and a large engine. The best combination is when mass is balanced by the engine size.

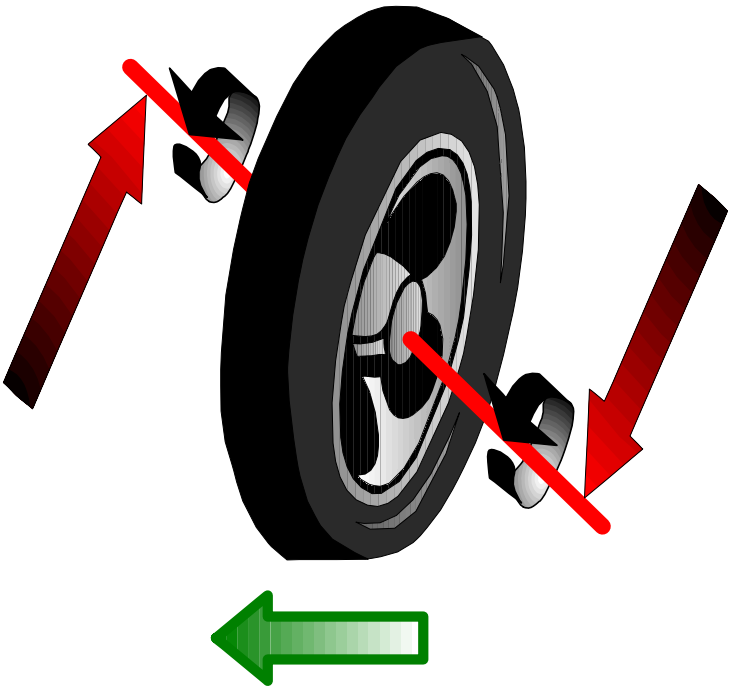
THE THIRD LAW

To every action force, there is an opposite reaction force.

The third law of motion is best described by comparing the forces which occur when a vehicle attempts to change direction. A center seeking, or centripetal, force is working against a center fleeing, or centrifugal force. If these forces balance, cornering occurs.

Most Important Considerations of Newton's Laws

The first and third laws of motion are the most important in overall vehicle control. The faster you go the longer it will take to stop or change vehicle direction.



You Only Control Two Things in a Vehicle

1. **Speed**

2. **Direction**

The laws of motion will always influence the amount of control you will have.

Gyroscopic Precession

A rotating object tends to remain rotating about its axis. When you attempt to change the direction the tires are traveling, resistance occurs between the tire tread and the driving surface. The resistance you feel in the steering is created by a physical force called gyroscopic precession.

Gyroscopic precession is described as a force acting ninety (90) degrees to the axis of a rotating object. (In this case a tire or wheel is the rotating object and the vehicle axle is the axis). The effect of this phenomenon is body roll.

The effects of gyroscopic precession can be controlled by slowing down steering inputs and making smooth adjustments to steering.

CENTRIPETAL / CENTRIFUGAL FORCE

In the right diagram above, the center of gravity in the vehicle wants to travel in a straight line. The front tires must overcome the tendency of the center of gravity and generate enough force to overcome that tendency. This force is referred to as centripetal (center seeking).

The driver and passengers feel the force pushing them towards the outside of the turn, which is described as centrifugal (center fleeing) force.

The diagram to the left is an example of the same forces using a rock attached to a string and being swung around in a circle. The rock will always want to travel in a straight line but the string (represented by the >) is developing enough force to overcome that tendency.

EMERGENCY VEHICLE OPERATIONS
GLOSSARY OF TERMS

Acceleration The rate of change of velocity. An increase.

Accident ***See crash.***

Acuity The capacity of either eye to recognize small space intervals in the discrimination of form.

Anti-Lock Braking System (ABS) A system that prevents the wheels of a vehicle from locking up. It works by utilizing a system of sensors on the vehicle wheels and/or axle that detect lock-up or lack of motion and then signals to a brake modulator, which in turn releases brake pressure to the specific wheels, allowing them to begin turning again. The system then reapplies pressure to maintain maximum braking without lock-up.

Apex The point of a corner, curve or turn where the vehicle is actually closest to the inside usable portion of the roadway.

Boxing A legal intervention tactic used to assist in the termination of a vehicle pursuit. Involves placement of police vehicles around a fleeing vehicle causing the fleeing vehicle to stop.

Brake Fade The loss of braking efficiency due to excessive heating of the the braking system components. Often occurs from excessive use of the brakes, when the braking components reach the same temperature and can no longer effectively exchange heat.

Brake Lock-up The application of brakes to the point where the wheels no longer rotate.

Braking Distance The distance through which brakes are applied to slow a vehicle; the shortest distance in which a particular vehicle can be stopped by braking from a specified speed on a particular surface; the distance from the point of application of the brakes to the point of the stop.

Braking, Threshold The application of brakes to a point just short of wheel lock- up.

Channelization A tactic used during a vehicle pursuit to direct the fleeing vehicle along a desired path. May be used in conjunction with other intervention tactics. Also used to prevent third party vehicles from entering the course of the pursuit.

Coefficient of Friction The measurement of cohesion between two surfaces. ***Synonymous with Drag Factor.***

Contact Patch ***See Tire Footprint.***

Crash The occurrence in a sequence of events which usually produces unintended injury, death or property damage.

Damages (Actual, Compensatory or Special) Money award in a lawsuit that compensates for injury only.

Damages (Punitive) Money awarded in a lawsuit over and above the compensatory levels. It serves as a punishment for the actions causing the injury or incident.

Deceleration The rate of change in velocity when slowing down.

Defendant The person or entity in a lawsuit who is accused of causing the injury claimed in the lawsuit.

Drag Factor A number which has been assigned to scientifically describe the slipperiness of a surface. The higher the drag factor, the greater the resistance. ***Synonymous with Coefficient of Friction.***

Driving, Defensive Operating a vehicle in such a manner as to be prepared to avoid involvement in a preventable crash, regardless of the road and weather conditions.

Driving, Emergency A response to a situation that is life threatening or involves an extreme risk of property loss and justifies the legal use of emergency equipment and warning devices.

Driving, Non-emergency All vehicle operations in modes other than emergency or pursuit modes.

Driving, Pro-active Driving in a manner to achieve a desired outcome.

Driving, Pursuit The act or instance of attempting to overtake or capture a fleeing vehicle and apprehend the occupant(s).

Duty An obligation of an agency to provide a service or protection.

Emergency A situation that justifies the use of emergency lights and siren. The precise definition varies from state to state. May be defined as a situation involving life or death or a situation involving the potential for extreme property damage or serious physical injury or death.

Emergency Warning Devices A siren and/or flashing emergency lights which meet the criteria of state statute.

Energy, Kinetic Energy associated with motion; the energy possessed by a body in motion.

Energy, Potential Energy a body possesses by virtue of its position, for example, a vehicle parked on a hill or the energy stored in a spring as it is compressed or stretched.

Evasive Action Any action taken by a driver to avoid a hazardous situation or crash. May be steering, braking, accelerating or a combination of those tactics.

EVOC An acronym standing for **E**mergency **V**ehicle **O**peration **C**ourse.

Force That which changes the state of rest or motion of matter, measured by the rate of change of momentum.

Force, Centrifugal The perceived force of a body in motion which tends to keep it continuing in the same direction rather than following a curved path; a combination of gravity and friction acting against inertia.

Force, Centripetal The force on a body involved in a curved motion which is directed towards the center axis of rotation. The force required to keep a moving mass in a circular path. A force which impels an object towards a center of rotation.

Force, Gravitational A constant force which creates weight.

Force, Inertia The tendency of a body to resist acceleration; the tendency of a body at rest to remain at rest or a body in motion to stay in motion in a straight line unless compelled to change by an outside force. *Newton's First Law is an example of inertia.*

Force, Momentum The product of a body's mass times velocity. An amount of motion; it is the property of a moving body which determines the length of time required to bring it to a state of rest.

Friction
(1) The rubbing of one object or surface against another.
(2) Resistance to any force trying to produce motion; constantly present and always working opposite the direction in which an object is moving.

Friction, Rolling A force exerted by one solid surface on another when the two surfaces are in immediate contact and one surface is in motion. A prerequisite to steering, e.g., the front wheels must be rolling in order to change direction of the vehicle.

Friction, Sliding A force exerted by one solid surface on another when the two surfaces are in immediate contact and one surface is sliding past the other. Changes in vehicle direction are not possible when the front wheels are in this condition.

Friction, Static A force exerted by one solid surface on another when they are at rest; the holding force between two surfaces at rest.

Front End Swing The movement of the front end in the opposite direction of the steering input when backing up.

Handling The ability of a vehicle to respond to a driver's inputs with zero or minimal negative reaction and the ability to compensate for sudden irregularities in road or environmental conditions.

Hydroplaning A condition occurring when the tires break contact with the surface of the roadway and begin traveling on top of water on the roadway.

Invincibility Syndrome A false sense of security stemming from the belief that the general public will properly respond to your emergency warning devices.

Legal Intervention A term used to differentiate intentional contact with a fleeing vehicle from contact caused due to a crash or other unplanned collision. Often refers to a specific tactic or tactics used to terminate a vehicle pursuit.

Liability, Direct The liability that is imposed upon a person for causing injury to another through a negligent or willful misconduct.

Liability, Municipal The liability which is imposed upon any agency of government below the state level for causing injury to a person or property through negligence.

Liability, Vicarious or Indirect The liability which is imposed on one who is without personal fault or complicity because of the relationship that person bears towards the person who actually performed the wrongful act or omission.

Mental Conditioning The preparation of a driver to deal with the psychological, physiological and environmental conditions that are encountered when driving a vehicle.

Mechanics A branch of the science of physics which deals with what happens when forces act on material objects. Also; refers to those who repair vehicles.

Negligence Failure of the officer to conform conduct to the standard which a reasonable officer would have conformed under the same or similar circumstances.

Oversteer The tendency of a vehicles rear to take a path wider than the front of the vehicle. Referred to as Rear Skid.

Perception
(1) Awareness of objects and other data through the medium of senses.
(2) Having insight or intuition, as an abstract quality.

Plaintiff The person who initiates a civil lawsuit.

Police Package A vehicle manufacturer's modification of a standard passenger vehicle to meet the demands placed on a police patrol vehicle. Typically involves modification of the braking, suspension and electrical systems.

Precision Immobilization Technique (PIT) A legal intervention technique whereby the officer intentionally creates contact with a fleeing vehicle in an attempt to create a spin. Involves minimal contact with the fleeing vehicle and some risk of injury to the officer and occupant(s) of the fleeing vehicle. Also known as: ***Pursuit Immobilization Technique or Tactical Vehicle Intervention (TVI).***

Pursuit An event involving a peace officer attempting to apprehend a person (s) in a motor vehicle while that person is trying to avoid capture by willfully failing to yield to the officer's signal to stop.

Ramming A legal intervention tactic designed to immediately stop the fleeing vehicle from further activity. This typically involves extensive damage to the vehicles and increased risk of injury to the officer and to the occupant(s) of the fleeing vehicle.

Rear End Cheat The tendency of the rear tires of a vehicle to travel along a different path than the front tires of a vehicle in forward motion. They may track inside, outside or along the same path depending on the speed tires and load distribution. *Similar to* ***Trail-over****.*

Respondeat Superior Latin term for "Let the master answer." The legal theory that the employer is liable for the wrongful acts of the employee where the employee is acting within the scope of employment. This theory is applicable only in state courts and does not apply at the federal court level.

Ride The result of a vehicle's absorption of the irregularities of the road. This is accomplished through the design of tires and suspension system components (shocks, springs, etc.)

Siren A device used to generate and transmit the easily recognizable siren sound whose frequency varies with time, used as a warning device by police, fire and emergency services vehicles. There are three types of sirens: electrical, mechanical and electro-mechanical.

Skid The loss of traction to one or more wheels.

Skid, Braking The loss of traction when one or more wheels are locked by excessive braking pressure.

Skid, Cornering The loss of traction while negotiating a curve or turn at a speed faster than can be sustained by the tire to road traction limits.

Skid, Impending A preliminary skid caused by maximum pedal pressure short of locking the brakes. Sometimes improperly used as a synonym for threshold braking.

Skid, Power The loss of traction when excessive power (acceleration) is applied, cause the drive wheels to spin and no longer provide drive or cornering traction.

Space Cushion The open area surrounding a vehicle while it is in motion. An "escape route" to the front, rear and sides.

Spatial Relating to or involving space.

Spike Strips A device used to assist in the termination of vehicle pursuits. Typically involves a strip containing multiple hollow-core spikes which embed in a tire as it crosses the strip and allows a controlled release of air pressure to the effected tires.

Strategy An overall plan to increase the probability of success and to minimize the probability of failure. ***Distinguished from Tactic.***

Supervisor An individual having responsibility for the control or training of others.

Tactic The actions of an individual or small group for achieving a limited goal or objective. ***Distinguished from Strategy.***

Time, Reaction The total length of time it takes for the brain to receive the information from the senses (eyes, ears, nose), make a decision, transmit the decision to the appropriate muscles and for those muscles to respond.

Time, Spatial Judgement or Rate of Closure Ability to judge the proper rate of deceleration necessary to avoid a hazard or negotiate a curve.

Tire Footprint The contact area of the tread of a tire with the surface of the road. ***See also Contact Patch.***

Tort A private or civil wrong against a person or property for which a court may award money damages.

Tort, Constitutional A private or civil wrong against a person or property resulting from the violation of a right guaranteed by the United States Constitution.

Tort, Intentional A wrongful act committed by a person who knows that the law requires the act not be committed.

Track
(1) The distance on the ground between the center of the tire tread on one side of the vehicle to the center of the parallel tire tread on the opposite side.
(2) The location where the actual driving portion of an EVOC course occurs.
(3) A venue where athletes participate in contests of physical skill and prowess.

Trail over The tendency of the rear tires to take a path inside that of the front tires. ***Similar to Rear End Cheat.***

Understeer The tendency of a vehicle to continue in a straight line and resist turning. The tendency of the front of a vehicle to take a wider path than the rear of the vehicle. *Referred to as Front Skid.*

Vehicle Control Developing an understanding of the principles and developing the proficiency pertaining to the successful operation of vehicles under all driving conditions.

Vehicle Dynamics Any force, action or law of physics that affects the path of a vehicle in motion.

Vehicle, Marked A police patrol vehicle equipped with a permanent emergency roof light, siren and police agency identification decals. It may or may not be painted with standard colors.

Vehicle, Semi-Marked A police patrol vehicle equipped with a siren and permanent emergency lights in the grill area or mounted in the front or rear window areas.

Vehicle, Unmarked A police vehicle with no standard markings or other indicator that the vehicle is being operated by law enforcement. It may or may not be equipped with portable or concealed emergency lights and siren.

Velocity The time rate of motion in a fixed direction; the rate of change in position relative to time; speed of motion in a particular direction.

Vision, Tunnel A narrow arc of vision. The focus of attention on a particular area or object to the exclusion of adjacent areas of activity. Associated with an adrenaline response in the body.

Vision, Peripheral A wide arc of vision that allows a person to see objects to the right and left of center.

Visual Horizon The point at which a driver's eyes are focused on the roadway.

Wheel Base The distance from the center of the front wheel to the center of the rear wheels.

Weight Transfer The transfer of weight to the front, rear or either side caused by acceleration, deceleration or turning.

Weight Transfer, Lateral The transfer of weight from side to side.

Weight Transfer, Linear or Longitudinal The transfer of weight from the front to the rear or vice versa.

DRIVING COURSE RULES

1. **ABSOLUTELY NO HORSEPLAY ON THE COURSE. SAFETY IS PARAMOUNT!**

2. **WHILE DRIVING YOU MUST HAVE YOUR SEATBELT SECURED UNLESS OTHERWISE INSTRUCTED.**

3. **KEEP YOUR HANDS AND ARMS INSIDE OF THE VEHICLE AT ALL TIMES.**

4. **DO NOT USE SIREN UNLESS INSTRUCTED.**

5. **PAY STRICT ATTENTION TO SPEED LIMITS.**

6. **USE CAUTION AT ALL TIMES. DO NOT MAKE AN UNSAFE MOVE, EVEN IF YOU HAVE BEEN INSTRUCTED TO BEGIN AN EXERCISE.**

7. **IF YOU DO NOT UNDERSTAND SOMETHING, ASK AN INSTRUCTOR.**

8. **NEVER ANTICIPATE A COMMAND.**

9. **TREAT ALL OF THE VEHICLES AS IF YOUR LIFE DEPENDS UPON THEM...IT DOES.**

References

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